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THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

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Critique: "American Versus German City Planning"

By BYRN J. HOVDE*

MARTIN Wagner's article, "American versus German City Planning," in the November 1946 number of *The Journal of Land & Public Utility Economics*, is a curious mixture of German Nationalism and a penetrating critique of American government as it relates to city planning.

With all due respect for history—and this writer is himself an historian by craft—it seems just a little far-fetched to carry the thesis of German democracy in land use and city planning back to the pre-feudal Teutonic village community. True, historians do generally recognize in the pre-feudal village, even in the feudal village, some democratic functions. A few have even been quite romantic about these functions, ascribing to these early communities the origins of modern democracy. Von Maurer and Sir Henry Maine, quoted by Wagner, are foremost among them. But romantic and nationalistic historians are not to be fully trusted. The historical truth is that in all of human history, from the primitive

to the present, democracy and the "Feuhrer"-principle have contended against one another. Furthermore, a type of democracy suitable to a pre-feudal village, German or other, is hardly suitable to the contemporary industrialized city.

When it comes to the comparative democracy of German towns and cities in the modern period, let us say roughly from 1750 to 1850, with that of American towns and cities, it is certainly doubtful whether the former, with their considerable social stratification based on wealth and guilds were superior to the direct, simple democracy of New England towns or American frontier communities. The historical viewpoint is violated rather seriously in Wagner's statement (p. 322) that "it cannot be denied that up to the present time no better system of communal representation has been found than that which grew organically out of the pre-feudal village community and the medieval town community." That two-chambered system of representation, based originally on a division in society

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rather than on unity, was, as Wagner rightly points out, gradually transformed in the course of social evolution. But there is no magic in the bicameral system, as we have ample cause to know in the United States from our experience with state legislatures and with Congress. On the contrary, our own experience seems to prove that the uni-cameral system has very great advantages, especially at the local level of government.

There is no good reason why Americans should ape the German or any other system. We have developed governmental institutions that are quite as democratic and potentially quite as efficient. What we have not done yet, but are in the process of doing, is to develop a strong tradition of public interest as against individual interest, and a real concern with planning. The reason is certainly not the inferiority of American democracy to German democracy before 1933. For one thing American democracy is real enough to afford many economic and social opportunities. Where the German citizen was largely forced to stay at his father's social level and seek his happiness by making it as pleasant as possible, the American may by his own superior ability and effort abandon that level for one higher up in the scale. And most Americans naturally put this individual planning ahead of organized community planning for others. Furthermore, Americans are not place-bound like most Germans were. Being place-bound, Germans tended to think more of the immediate environment and how it could be made pleasant than do the Americans, who are freer to move if they wish in a country that offers infinite variety.

Wagner is right, of course, in ascribing the planlessness of American cities so largely to the spirit of individualism or *laissez faire*. That spirit affected western

Europe, including Germany, too, but it hit the United States with exceptional force because at the time of its heyday a whole continent filled with incomparable resources lay open to exploitation. Why should Americans stop to plan cities for a hundred to a thousand years when these opportunities and vast spaces could be seized upon by merely moving to another homestead or by highly concentrated individual effort? That would have involved taking time out from personal capital accumulation to build governments and bureaucracies for an ideal that did not exist. There is no point in casting blame upon Americans and immigrants for being swept along by the tidal wave. In the New World the ideals of the Old changed rapidly. Even the Germans promptly cast away their German city-planning ideals (so loosely did they sit). They could not help it. The natural forces of capitalism, mechanism, and *laissez faire* were utterly irresistible.

If these forces came later to Germany and if city-life was strong enough there to withstand some of their worst effects, the Germans need not feel greatly superior on that account. They could not help that either. For a brief moment, say between 1875 and 1914, German cities were able to combine the old and the new fairly well. German cities were externally neat and attractive, the smaller ones were lovely with archaic quaintness, and there were intelligent beginnings in the direction of modern city planning, some of which bore real fruit in the 1920's. Had Germany scrupulously avoided war, she could have made great contributions to the evolution of urban culture throughout the world. But in 1914 German democracy was too weak to restrain the militarists, in 1933 too weak to resist Hitler, and in 1939 it no longer existed. What is now left of Germany's planned cities? A few pathetic monuments to a

noble past stand out because some effort was made by victorious enemies to spare them. The rest is rubble.

The lesson to be learned from Germany today is not in the first instance the techniques or the local political arrangements necessary for city planning. It is rather the compelling necessity to make democracy strong enough, both at home and abroad, to resist the so-called experts when they counsel war and to suppress the authoritarian principle of organized human life whenever it raises its head. If we do not do that, and if we allow a third world war to break out, we might as well quit worrying ourselves about city planning until that war is over. Then our children can have a fresh start in building cities, because ours will be gone as the German cities are gone now.

However, assuming that we Americans are prepared to uphold democracy, improve it, and prevent war, there is much we can learn about city planning from pre-Hitler Germany. When the nationalism and the bureaucratic theory are peeled away, there is much to learn from Wagner's article.

Wagner's main thesis is that the structure (if you can call it structure) and practice of local government in America is such as to practically preclude continuous city planning. He is right, too. Planners in this country are benignly innocent of knowledge in political science and in the practice of politics. In this respect they are as pure as the virgin who is biologically ready for sex, who cannot achieve her purpose without it, but who shudders at the very thought. Either planners must turn politicians, or politicians must learn planning. In either case they must transcend mere politics and function as statesmen.

Real statesmanship, and something more, will be required to reorganize local government in America, not only in the

interest of city planning but in the interest of coordination and efficiency in every phase of the public business. Wagner is quite right in his severe condemnation of long ballots and short terms which have the effect of reducing public office to a momentary favor bestowed not even by the people but by the strongest party machine. He is right again when he deplores the fragmentation of local government by the creation of semi-autonomous boards and commissions, enabling mayors to disclaim responsibility and such boards and commissions to plead inadequate powers. At this moment, for example, Mayor O'Dwyer in New York contends properly that it is the business of the Board of Transportation to conduct its relations with the Transport Workers' Union in such a manner as to operate the transport system without strike interruptions, and the Board replies cogently enough that its proposal for a ten-cent fare was killed by the Mayor, thus depriving the Board of the funds with which to grant wage increases. Certainly Wagner is right when he insists that metropolitan consolidation into one organic city is necessary—rather than the meek, cowardly, and eventually vicious proposal of many planners here that the planning function alone be placed in the hands of a metropolitan agency. Planning is no isolated function, separable from the other integral function of government. Planning can be only a theoretical activity if the planning agency is not endowed with the powers of enforcement, and such powers can only, in the American tradition, be vested in a unitary municipal corporation, whether it be a great metropolitan city like New York or a vastly strengthened county government. Measures which fall short of genuine metropolitan consolidation are at best merely educative over the long term it will take to prove them ineffective.

A statesmanship willing to undertake such radical measures in municipal political science is extremely necessary.

But that kind of statesmanship must be backed up with something more, namely widespread citizen support. There is no use in demanding that American democracy follow any non-American patterns. Americans, like other peoples, must respond to the conditions of their own environment. Take the problem of urban land, for example, and the traditional private property viewpoint in America concerning its use. Though by no means as utterly unconcerned in our land legislation with the public interest as Mr. Wagner describes us, it is still true that the will to enforce the public interest against the private interest in the grand manner is too much lacking among us. This would still be true today if in one tidal wave of statesmanship we should immediately improve our local instrumentalities of government. And without such a popular will no mayor of the re-constituted city could achieve anything of great consequence. As noted earlier, this attitude on the part of the American people is no historical aberration. We got this way naturally. And we are going to have to change naturally. That follows from the essence of American democracy, which does not admit the right of any technical expert nor of any representative government, whether in one or two chambers, to do anything but what the people themselves want done. One can only admire what Berlin achieved for itself in the reorganization of 1920 to 1923, but we are going to have to come to something similar, not identical, in our own way.

The black picture of local government and planning in America presented by Mr. Wagner is true, so far as he has framed it. But, like most pictures, it is a selected detail and not the whole

panorama. Mr. Wagner does not allude to it, but every American knows that the sense of public interest has increased markedly in the last twenty years. It is more significant than most people realize that in most of the states of the union the supreme courts have accepted an interpretation of the police power that includes the condemnation of private property for adequate housing and urban redevelopment and that the Supreme Court of the United States and that of New York State have interpreted the public welfare clauses to include social purposes never dreamed of until recently. One may not notice it when one waits impatiently, but the tide of public opinion is definitely rising to demand that in our American way we shall provide for urban planning and redevelopment and for the improvements in governmental instrumentalities with which to achieve them. When the great church bodies and the schools and hundreds of civic organizations begin to call for housing and redevelopment legislation it may be taken for granted that the process of democratic education has gone far. It means also that planning and the necessary governmental reconstruction are not far behind.

Thus, on the whole, the future does not look as bleak as Mr. Wagner sketches it. His prophecy that devastated German cities—and others in Europe—will *have* to be planned and will necessarily be *better* planned than they were before the war, whereas American cities are doomed to decay, is not impressive. It is probably more plausible to prophesy that out of utter devastation the first concern of those cities will have to be the bare essentials of life, with little regard to good planning. The world has little experience with planning under such circumstances, but what it has would hardly warrant Mr. Wagner's conclusions.

It may cause some melancholy to

realize that America will be slower to reach the planning stage that Germany did—or the Scandinavians and the British—before the last war but that is beyond our power to correct. We arrived by a later bus to collective bargaining, social security, and several other stations of

public interest for the same reason, namely, that it was more pleasant to dawdle around at home than to rush for the bus. But when we decide to get a move on we must take democracy—American democracy—with us. We shall not be ourselves with any other.

Public Utility Holding Companies: The Death Sentence and the Future

By WILLIAM H. ANDERSON*

Introduction

WHEN the United States Supreme Court handed down its decision on the "death sentence clause" in the North American Company case on April 1, 1946, it made the possibility of effective public utility holding company regulation more real than at any time since the passage of the Public Utility Holding Company Act of 1935.¹ For over ten years the Securities and Exchange Commission has struggled to carry out the mandates of Congress with but slow and uncertain progress. The effort to enforce the purposes of the law has met with public utility resistance all the way. Now the path is opened for the type of regulation of holding companies that Congress, individual utility investors, utility consumers, and the general public have longed for all these years.

Shortly after the Supreme Court had spoken, some writers gave the impression that the decision was a serious "blow" to utilities and that it was literally a "death-sentence" to all holding companies. A careful reading of the opinion reveals nothing of the kind. A fair evaluation of the Court's decision and an accurate understanding of the whole problem of holding company regulation, however, can best be achieved by reviewing briefly the economic history and behavior of public utility holding companies that prompted the passage of the Act of 1935. That review will necessarily take us back to the rapid expansion of holding companies in the 1920's, their extensive abuses in every state in the Union, the

heroic struggle in Congress for the passage of the Act of 1935, the resistance of the holding companies since the law was approved, and the part the Securities and Exchange Commission and the Supreme Court have played in trying to make the Act effective.

The Expansion of Holding Companies in the 1920's

The rise of the holding company was a process not unlike that of other forms of business organization, exhibiting stages of infancy, expansion, and mushroom growth. Once New Jersey had opened the way to its legal existence, the holding company soon began to serve legitimate as well as questionable purposes. In the period before 1910 in the public utility field, it made a definite contribution in financing the purchase of utility plant and equipment. Even in the 1920's many holding companies continued to render valuable services to young and growing operating companies. They assisted materially in financing, in supervision of construction, in supplying continuous engineering, accounting, and legal counsel, and in buying materials and supplies at lower prices for the individual operating units. When the holding company functioned in this manner it behaved like the modern corporate version of Adam Smith's self-interested, omniscient entrepreneur organizing the factors of production in the market.

Once the holding company became recognized as an instrument of control as well as of service, its use was extended

Hamner, Graduate Assistant in the Department of Economics in the preparation of this article.

¹ *The North American Company v. Securities and Exchange Commission*. 90 L. ed. 737, 66 Sup. Ct. 785 (1946).

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rapidly. By 1915 the Department of Agriculture estimated that eighty-five large public utility companies controlled 68.6% of the electric power generated that year. Ten years later the Federal Trade Commission reported that holding companies dominated 76.5% of the industry. Throughout the 20's the major holding company groups indulged in a mad race to acquire both independent and municipally-owned properties. Of the fifty-seven utility holding companies in existence in 1935, forty-one companies were chartered from 1922 to 1932. At the peak, in the latter year, about 80% of the private electric operating-companies were a part of holding company systems and about 45 % were controlled by the three largest.² The postwar decade gave the holding company its heyday. Among the big names that crowned large holding company combinations were: "Electric Bond & Share," the "Insull Interests," "Consolidated Gas," "North American," "Standard Power & Light," "Associated Gas & Electric," "Stone and Webster," and others.

The Abuses of Holding Companies

But the heyday of the holding company was not without its abuses. Business gigantism made for peculiar disorders. Doubtless some of them should not have been unexpected, for had not Adam Smith himself said:

"People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices."³

Long investigation by the Federal Trade Commission had yielded abundant and sustaining evidence of malpractice. Like other monopolists before

them, the holding companies were *fixing prices* all along the inter-company line; but unlike most previous monopolists they were doing so largely with impunity; they were effecting control of operating company accounting, of rates and of dividends in successful defiance of state governments which were determined to deal with them in protecting the public interests. State governments, however, were relatively impotent to control holding company operations in interstate commerce.

The lack of what courts called "arms-length bargaining" meant that as between parent and subsidiary in the *pricing* of services, of construction work, and of equipment and materials, charges were excessive. All this meant that in economic terms these internal exchanges between holding company and operating company were untested by the forces of a free, competitive market. Not satisfied to sell and serve at excessive prices, some parent companies begged "up-stream" loans from the subsidiaries at low rates of interest.

Moreover, "pyramiding" had produced an entity in organized business that behaved more and more like a government. If control by relatively fractional interests "within" a corporation had become common and a challenge to the concept of individual enterprise, then the *pyramid holding company* made mockery of the private property concept in which the central feature is disposition and control of productive instruments.

In the issuance of securities a variety of evils grew and spread like a cancer. Lack of uniform accounting made the earning position of the issuing company uncertain, the investment market less efficient in its pricing function. Free from the need to comply with issue re-

² Summary Report of the Federal Trade Commission. 72-A, p. 38.

³ Ed., "Adam Smith," *Fortune*, July 1946, p. 180.

quirements of state governments, holding company securities were being marketed on the basis of fictitious asset values, thus burdening the operating companies with the support of overcapitalized structures and tending to prevent voluntary rate-reductions. Even the market itself was manipulated to bring higher prices for holding company floatations of stock.

And finally, the limits of managerial efficiency were being exceeded in the cases of scattered and fragmentary holdings that were clearly unrelated to any scheme of integrated and coordinated operating properties.

The Public Utility Holding Company Act of 1935

The process by which public utility holding company activities have been brought within the scope of regulation is not unlike that by which the operating utilities have themselves been identified as "affected with a public interest." The same "stages" of development are involved:⁴ the *first*, in which widespread abuse is generally recognized and gives rise to public opinion calling for government intervention to establish standards of lawful behavior; the *second*, in which investigation develops more precise formulations susceptible of being drafted into legislation of social control; and the *third*, in which questions of legal and constitutional validity are presented for testing and final review by the Supreme Court.

The particular abuses connected with this Act have already been reviewed and we turn briefly to the nature of the "resistance" which in a given case must be overcome before articulated opinion can become law. Here the methods of "the opposition" are not unfamiliar and do not lack for completeness or imagination.

The Wheeler-Rayburn Bill, introduced early in the first session of the 74th Congress (January 1935) was considered by the utilities to be worthy of their heaviest artillery. All legitimate appeals were utilized and to them were added activities suggesting conspiracy and fraud. This public relations "offensive" did not stop with a running fire of newspaper condemnation and magazine attack, but included as well floods of "protest telegrams (some of them bogus, as later disclosed by the Black lobby investigation). A Federation of Utility Investors was organized to fight the bill. This agency permitted none of the widows and orphans to escape the force of its terroristic propaganda."⁵

But the bill survived the engagement and was enacted into law. Its important sections merit some statement. Public utility holding companies and their subsidiaries in the electric power and gas industries were declared to be "affected with a national public interest."⁶ Federal jurisdiction is expressly grounded upon "interstate commerce" and the use of the mails. A recital of holding company malpractices is linked with the general purpose provisions to "eliminate the evils," and is followed by statements of proximate purposes: "to compel the simplification of public utility holding company systems."⁷

The Act's definition of the holding company adds little new to identification beyond the fixing of "10% of the voting stock" as an index of the quantity of stock ownership necessary to bring the activity within the scope of holding company regulation.

Section 4 of the Act requires that on or before December 1, 1935, all holding companies coming within the scope of the

⁴ Irston R. Barnes, *The Economics of Public Utility Regulation* (New York: F. S. Crofts & Co., 1942), p. 1.

⁵ C. Woody Thompson and Wendell R. Smith, *Public*

Utility Economics (New York: McGraw-Hill Book Company, Inc., 1941), p. 490.

⁶ Sec. 1. (a).

⁷ Sec. 1. (c).

law register with the Securities and Exchange Commission and file a registration statement giving the Commission certain relevant information. Failure to register and supply the information meant the loss of the right to use the mails and channels of interstate commerce.

The so-called "death-sentence" provision declares: "It shall be the duty of the Commission, as soon as practicable after January 1, 1938: To require . . . each registered holding company . . . to limit (its) operations . . . to a single integrated public-utility system . . ." subject again to the power of the S.E.C. to grant special permission for operations outside such limits.⁸

In carrying out its simplification and integration powers the Commission has authority to order holding companies to divest themselves of both securities and properties. Great grandfather companies and unnecessary holding companies can be dissolved. Holding companies can be forced through a recapitalization process, ordered to reorganize their capital structures, and to redistribute voting rights. Excessive capitalizations can be scaled down and capital structures simplified by eliminating bonds and preferred stock. The Commission, however, can permit a registered holding company to continue to control one or more additional integrated public utility systems if it finds that each additional system cannot be operated independently without loss of substantial economies, that all such additional systems are located in one state or adjoining states and that the continued combination is not so large as to impair the advantages of localized management, efficient operation or the effectiveness of regulation. The Act thus grants the Commission dis-

cretionary powers to permit a holding company to own more than one integrated system when the purposes of the Act are not violated. By and large the powers of the S.E.C. over the continued existence of holding companies are both broad and deep. It must be noted, however, that the Commission cannot proceed without due process of law (due notice and opportunity for hearing) and some steps can be taken only in conjunction with the federal courts.

Some sections specifically declare certain types of transactions and operations by holding companies unlawful, while other types can be performed only by and with the consent of the Commission.⁹ Among the former are absolute prohibitions against more than two layers of holding companies, security-selling from house to house, sales of holding company stock by employees and officers of the subsidiary company, "upstream loans" from subsidiary to parent company and political contributions to persons or political parties. Among the types of transactions which require Commission approval are all sales, service and construction contracts, "inter-company" loans, holding company dividend payments and security transactions, sales of utility assets, acquisitions of other utility assets or securities, and proxy soliciting.

The First Test of the Act of 1935

Passage of the Act was followed by a "sit-down" strike of the public utility holding companies, unbroken until the determination was reached in the Electric Bond and Share case.¹⁰ In this action the S.E.C. brought suit to enforce Sections 4(a) and 5 of the Act. Section 5(a) provides for registration of holding companies as defined in Sec. 2(7) (a). Section 5(b) asserts that it "shall be the

⁸ Sec. 11(b)(1).

⁹ Sections 6, 7, 8, 9, 12, 13 and 15.

¹⁰ *Electric Bond and Share Co. v. S.E.C.*, 303 U.S. 419 22 P.U.R. (N.S.) 465 (1938).

duty of every registered holding company to file . . . a registration statement . . ." and sets out the kinds of information that may be required to aid the Commission to carry out the Act.

The defendants placed these sections in issue by denying their validity and seeking a declaratory judgment that the entire Act was invalid.

The Supreme Court found in answer to the *first* question, i.e., whether the defendant companies are engaged in activities bringing them within the ambit of congressional authority, that the operations in question were partly in interstate commerce and sufficiently so that in the light of the findings supported by the stipulation, "we perceive no ground for a conclusion that the defendant companies . . . are not engaged in activities within the reach of the congressional power." *Secondly*, the petitioners argued that Sections 4(a) and 5 are inseparable from the entire Act; so that invalidity of part would render the whole invalid. But the Court looked to the expressed intent of the Congress as to separability and sustained provisions directing a division of the Act when validity is in question. *Thirdly*, the petitioners contended that at least Sections 4(a) and 5 alone were invalid; but the Court found "no reason to doubt that from these defendants . . . Congress was entitled to demand the fullest information as to organization, financial structure and all the activities which could have any bearing upon the exercise of Congressional authority."

The decision removed all doubt as to power of Congress to require interstate holding companies to register and to furnish reasonable information. The effect of the opinion was to end the holding company refusal on registration. One by one the various holding company groups registered and supplied the "registration statement." The Commission

was now in a position to lay the foundations for its positive regulatory work.

The Second Test: The North American Case

The decision in the Electric Bond and Share Co. case made effective the registration provisions of the Holding Company Act, gave the Securities and Exchange Commission jurisdiction over interstate holding companies, and compelled the holding companies to supply the Commission with the necessary information upon which to proceed in enforcing the regulatory provisions of the Act. The Act had set December 1, 1938 as the date when the Commission could begin effectuating the integration, corporate simplification and reorganization provisions. However, because of the delay caused by having to carry the Electric Bond and Share case to the Supreme Court, it could not begin enforcing the "death sentence" until 1940.

It met with no small amount of resistance and delay, however, during the first few years. Some progress was made on a voluntary basis, but most of the larger holding company units failed to take much positive action. In 1942 the S.E.C. issued an order requiring the North American Company to divest itself of all its properties except those in the St. Louis area. This the company refused to do without a court battle. The case was argued before the Supreme Court in November of 1945 and the decision rendered on April 1, 1946.¹¹ The Court clearly upheld the so-called "death sentence" and integration clause of the Act of 1935. Some analysis of the facts in the case and the opinion of the Court may be necessary to portray the full significance of the decision.

The North American Company is a utility holding company system which as

¹¹ *The North American Company v. Securities and Exchange Commission*, 90L. ed. 737, 66 Sup. Ct. 785 (1946).

of December 1, 1940 controlled directly or indirectly some 80 corporations operating electric-power and gas utilities, railroads, coal mines and amusement parks in 17 states and the District of Columbia. The total assets of the system exceeded \$2,300,000,000. North American owned stock "directly" in 10 of the corporations; held 79% or more of the common stock in 8 of them and 17.71% and 19.2%, respectively, of the voting stock of the other two. Three of the direct subsidiaries were registered holding companies, four were operating companies and the other three were an investment trust, a coal company, and an office building company, respectively. The electric service alone was rendered to over 3,000,000 customers in an area of roughly 165,000 square miles.

The issue at stake in the North American case was the "death sentence clause" (Sec. 11(b) (1) of the Act) authorizing the Securities and Exchange Commission to act to bring about the geographic and economic integration of holding company systems. More specifically the Court said it must answer two questions: (1). Did the powers granted the S.E.C. under the "death sentence clause" fall within the power of Congress to regulate interstate commerce? (2). Did the orders of the S.E.C. requiring the divestment of far-flung holdings violate the due process clause of the Fifth Amendment by taking property without due process of law?

The North American Company tried to avoid the interstate commerce power of Congress by claiming that it was merely the "owner of stock," that the ownership of stock was not interstate commerce and that the company was nothing more than "a large investor seeking to promote the sound development of its investment."

The Court, speaking through Justice Murphy, did not seem to have too much difficulty meeting this contention. It maintained that Congress had enacted the Public Utility Holding Company Act of 1935 in order to correct "grave abuses" which it had found in the use of the holding company device in the nation's electric and gas utilities. The Act was concerned with the economic evils resulting from uncoordinated and unintegrated public utility holding company systems. The opinion went on to say that these evils were found to be polluting the channels of interstate commerce and to take the form of transactions occurring in and concerning more states than one.

Were the activities of North American and its subsidiaries interstate in character? To answer this question the Court presented an analysis of those activities in the following language:

"The interstate character of North American and its subsidiaries is readily apparent from the Commission's survey of their activities. North American is more than a mere investor in its subsidiaries. (Citing cases). It is the nucleus of a far-flung empire of corporations extending from New York to California and covering seventeen states and the District of Columbia. Its influence and domination permeate the entire system and frequently evidence themselves in affirmative ways. The mails and instrumentalities of interstate commerce are vital to the functioning of this system. They have more than a casual or incidental relationship. (Citing cases). Without them, North American would be unable to exercise and maintain the influence arising from its large stock holdings, receiving notices and reports, sending proxies to stockholders' meetings, collecting dividends and interest and transmitting whatever instructions and advice may be necessary. Nor could North American maintain its other relationships and contacts with its own subsidiaries without the use of the mails and facilities of interstate commerce. Such interstate commercial transactions involve the very essence of North American's business."¹²

¹² 90L. ed. 741-742.

The Court held firmly to the view that the activities of the holding companies affected by the Act were interstate in character and clearly within the purview of the right of Congress to regulate trade among the several states.

The Court went on to deal directly with the constitutionality of the "death sentence" from the standpoint of the due process clause of the Fifth Amendment. North American had argued that Section 11(b)(1), by compelling it to divest itself of its scattered subsidiaries and to confine its operations to a single integrated system, involved the taking of property without just compensation. The alleged taking of property was said to involve "a vast destruction of values." North American had claimed that its shareholders had the valuable right to pool their investments and thereby obtain the benefits alleged to flow from the efficient, common management of diversified interests. Justice Murphy met those contentions in a forthright manner:

"But Congress balanced the various considerations and concluded that this right is clearly outweighed by the actual and potential damage to the public, the investors and consumers resulting from the use made of pooled investments. Under such circumstances, whatever value this right may have, does not foreclose the protection of the various interests which Congress found to be paramount. . . . Congress has concluded from extensive studies made prior to the passage of the act that the economic advantages of a holding company at the top of an unintegrated, sprawling system are not commensurate with the resulting economic disadvantages. The reasonableness of that conclusion is one for Congress to determine."¹³

The Court re-enforced this principle with a bit of analysis which has validity both in fact and in law:

"Moreover, there is no basis here for assuming that in limiting the scope of North American's

operations there will be dispositions of securities for inadequate consideration, thereby raising the question as to whether there is a destruction of these values without just compensation. The Act does not contemplate nor require the dumping or forced liquidation of securities on the market for cash."¹⁴

Supported by the above rationale the Court held the "death sentence" clause of the Public Utility Holding Company Act constitutional both as a proper exercise of power over interstate commerce, and as not violating the due process clause of the Fifth Amendment. Most authorities in the public utility field will agree that the decision has cleared the way for the regulation of holding companies according to the tenor of the Act of 1935.¹⁵

The Significance of the North American Decision

What is the true significance of the decision? Some of its long-run meaning may hinge upon the kind of enforcement which the S.E.C. may give the Act of 1935 in the future. This in turn may depend upon the economic philosophy of the party in power and the character of the appointments to the enforcement body. Or it may depend upon whether or not Congress changes the law. Assuming not too drastic changes in the law or in the composition of the S.E.C. the North American decision can have a wholesome and constructive significance:

1. It will mean first of all that, finally, after ten years the Commission can go forward to carry out the intent of Congress and the people as expressed in the Act of 1935. The decision clearly gives the green light in that direction.
2. It does not mean that all utility holding companies are subject to elimination. The statute and the Supreme Court clearly state that only the far-flung holding companies shall fall under the ax of the "death sen-

¹³ Ranald A. Finlayson, "The Public Utility Holding Company Under Federal Regulation," *Journal of Business*, University of Chicago, Vol. 16., No. 3. In two parts: Part II p. 1., July 1946.

¹⁴ 90 L. ed. 749.

¹⁵ *Ibid.*

tence"; only scattered holdings must be divested. It is the purpose of the Act to permit and arrange integrated holding company systems in contiguous geographical areas. The holding company has not been outlawed. It has merely been asked to meet the test of social and economic justification.

3. It will give the S.E.C. the power to make holding company regulation effective and to eliminate the abuses of the far-flung utility empire that all too often existed largely for domination and control.

4. Finally, the results of effective holding company regulation will inure to the advantage of the operating company, the utility consumer, the utility investor and the general public. A review of the abuses of holding companies would indicate wherein each of these interests would benefit.

The Outlook For Holding Company Regulation

The immediate outlook for effective public utility holding company regulation is quite encouraging. Some progress had been made on a voluntary basis prior to the North American decision. As a result of the Supreme Court's action that company (which was one of the largest and most wide-spread) was compelled to begin divesting itself of some of its properties. It has already filed a new plan with the S.E.C. for divesting scattered properties and for the better integration of its St. Louis area properties.

Since the North American decision the tempo of filing plans has quickened because the holding companies realized that they were legally bound to act and that no useful purpose would be served by further dilatory tactics. Another set of factors that has contributed to the increase in the filing of plans, has been the higher level of security prices and the relative ease of financing during the latter part of 1945 and the first nine months of 1946. The stock market slump in the Fall of the latter year, however, has slowed down

the reorganization process and may even require the readjustment of some of the plans already on file with the Commission.¹⁶

As of June 30, 1945 about 342 companies with over \$4 billion of assets had actually been divested. As of June 1946 it was estimated that about \$4.5 billion in utility assets had been divested and that holdings of about \$7 billion still had to be disposed of before the divestment and integration program would be completed.¹⁷

However, a substantial number of reorganization and integration plans are already on file with the Commission and other plans are being submitted to that body from time to time. Among some of the holding companies whose plans are now under consideration by the S.E.C. are American and Foreign Power, American Gas and Electric, American Power and Light, American Water Works and Electric, Columbia Gas and Electric, and National Power and Light. Commonwealth and Southern has four plans before the Commission. Electric Power and Light has several plans. Middle West Corporation is in the final stages of its integration program. The North American Company has filed a new plan. Standard Gas and Electric has disposed of some of its holdings. Continental Gas and Electric has made substantial progress in the integration of its properties.¹⁸

The task of holding hearings on all these plans, of studying, adjusting and approving them will take the Commission not less than three years and perhaps more. The problems will no longer be those of forcing the holding companies to comply with the law. They will rather be the difficult administrative tasks of seeing to it that the plans are fair and

¹⁶ "Utility Financing Drags," *Business Week*, Oct. 19, 1946, p. 64.

¹⁷ James M. Gordon, "Highlights of Integration Programs for Leading Public Utility Companies," *Magazine of Wall Street*, Vol. 78, p. 350, June 22, 1946.

¹⁸ *Op. cit.*

equitable to all parties concerned, including the various classes of existing security holders. Already there is evidence that the most troublesome problems are the internal ones and that the squabbles will not be so much between the holding companies and the Commission as between the various classes of security holders to achieve better treatment under the reorganization plans.

It is now reasonable to conclude that we are definitely on the road to effective holding company regulation and a kind of regulation that we have never been able to achieve in any of our other anti-trust legislation. Sections 2(29)(a) and 11(b)(1) of the Act of 1935 have given the Commission a standard more *definitive* and workable for limiting the operations of holding companies than is found in any other anti-monopoly legislation enacted at any time in this country. That standard is "a single interconnected and coordinated system confined in its operations to a single area or region." It is to be noted, however, that by "more definitive" is meant not an absolute, but rather a relative appraisal. Few statutes can hope to avoid completely the necessarily painful process of filling their legal intents with the more precise meaning of actual case-fact law and court construction. Nevertheless, the standard of size and power of holding companies to be achieved by federal regulation, when taken in conjunction with the regulatory teeth of the Act, produces the end-result desired in a larger measure than does any other regulation of big business on the federal statute books.

One authority appraises the stringency of the Act of 1935 as follows:

"The Holding Company Act was a severe law. It was the most stringent, corrective legislation that ever was enacted against an

American industry. Yet forceful action was needed to straighten out the corporate organization and control of the electric and gas industries. The remedy was suited to the patient."¹⁹

Furthermore, the Act provides for "continuous control," for once a public utility holding company system has become divested of scattered properties and properly integrated, it cannot acquire additional properties or stock of other companies in the future without the consent of the Securities and Exchange Commission.

The problem of the acquisition of the stock of an operating company by a holding company came before the Commission during the past year. The American Gas and Electric Company sought the permission of the S.E.C. to acquire the common stock of the Columbus and Southern Ohio Electric Company. The Commission, however, refused to grant that permission. It found that the holding company's principal group of properties (known as the Central System) constituted a single integrated public utility system within the meaning of the Act. The Central System included electric utility plant valued at about \$443 million, earning gross operating revenues of \$102 million and serving an area of approximately 90,000 square miles located in the states of Michigan, Indiana, Ohio, West Virginia, Virginia, Tennessee and Kentucky. The Commission observed that the Central System approached the maximum size which it believed consistent with the standards of localized management, efficient operation, and effectiveness of regulation under the Act.²⁰

This limitation on the size of the Central System was further clarified in specifically refusing the American Gas and Electric Company the right to ac-

¹⁹ Emery Troxel, *Economics of Public Utilities* (New York: Rinehart and Company, Inc., 1947), p. 172.

²⁰ American Gas & Electric Company, S.E.C. release No. 6333.

quire the common stock of the Columbus and Southern Ohio Electric Company. It held that such an acquisition tended toward the concentration of control of public utility companies of a kind and to an extent detrimental to the public interest. The Commission concluded that "the acquisition of Columbus and Southern Ohio would not be merely the addition of a spur or connecting link to the system, but would represent a major extension into new territory which very materially and very substantially enlarges the system."²¹ This in spite of the fact that Columbus and Southern Ohio is contiguous and would "integrate" quite well.

Late in 1946, however, the S.E.C. permitted the American Gas and Electric Company to acquire the Indiana Service Corporation. This was done only after certain adjustments were made in the financial structure and in the voting power of the Indiana company as requested by the Commission. The decision in the latter case is entirely consistent with the principles enunciated in the Columbus and Southern Ohio Electric Company case. In the Indiana Service Corporation opinion the Commission was careful to distinguish the facts and the effects from those involved in its earlier decision. It said:

"True, we concluded that the sheer size of the resultant combination with Columbus and Southern Ohio would have been too large. However, we did not impose an absolute limitation on further acquisitions of any kind. We affirmed that the Central System approached the maximum size permissible under the standards of the Act, but we said the issue in each case depends upon the facts and specific considerations applicable to the case.

"Here, the effect of the acquisition on the size of the Central System would be relatively minute . . ."²²

"In the Columbus & Southern case *supra*, we observed that the acquisition of Columbus and Southern Ohio would not be merely the addition of a spur or connecting link to the system, but would represent a major extension into new territory which materially enlarges the system. It is apparent that the converse is true here in respect to both the territorial and operational relationships of Indiana Service with the American Gas Central System and in view of the above discussed data on size, we consider the situation respecting Indiana Service to be clearly distinguishable from that in the Columbus & Southern case. We are of the opinion that in this case the proposed acquisition is not so large as to make the resultant size of the Central System a controlling obstacle."²³

These decisions clearly indicate that the Securities and Exchange Commission is attempting to carry out the intent of the Holding Company Act without being unduly restrictive and arbitrary. It is not averse to preventing further acquisitions when these acquisitions are contrary to the purposes of the Act. On the other hand, it is reasonable in allowing additions when they do not create overly-large holding company systems and when they result in the kind of integration that contributes to the public interest.

Conclusion

The Public Utility Holding Company Act of 1935 supported by the decisions of the Supreme Court and administered by a Commission that sincerely attempts to carry out the intent of Congress should give us reasonably effective utility holding company regulation in the future. It should yield the quality of regulation that will be far more effective than any control of big business we have ever had in peacetime before. No other legislation has ever equaled the Holding Company Act in bringing about broad structural, managerial and financial changes in American industry. No law has ever

²¹ *American Gas and Electric Company*, S.E.C. release 6639.

²² S.E.C. Release No. 7054, December 14, 1946, p. 45.

²³ S.E.C. Release No. 7054, December 14, 1946, p. 46.

forced the "divestment" of billions of dollars worth of property. Capital structures have and will continue to be improved; bonds and preferred stock have and will be removed from holding company financial plans. Though the adjustment of top-heavy capital structures has improved short-term borrowing conditions, it has not opened up extensive new opportunities for investment. It will, however, improve the "soundness" of utility investment in the future.

Integration, divestment and striving for more localized management has brought company managers closer to consumers and the state commissions. The S.E.C. by its "single area" and "within one state" integration has brought operating company integration and even some aspects of holding company regulation within the grasp of state commissions. It is now up to these commissions to lend a hand in the process.

The Commission, however, in its divestment and integration work must yield an instrument more akin to a surgeon's scalpel than tiemaker's broad-ax. The concept of integration in the

utility field is substantiated by definite economic, managerial and technological advantages, but unless the administrative tasks in relation to integration are skilfully performed, the alleged benefits may not always be forthcoming. In fact, direct injury could be perpetrated upon operating companies and consumers. Furthermore, in its divestment and recapitalization responsibilities the Commission must exercise more than reasonable care in balancing the interests of the various classes of security holders and in making equitable adjustments to avoid loss to particular security holders.

What has transpired since 1935 does not sound in the death knell of all holding companies as such, but only of those which are scattered and far-flung—those which cannot be justified economically or technologically. It should mean a minimization of the "abuses" of the holding company device in the public utility field. Finally, over the years, protection and benefit should flow to the operating companies, utility investors, utility consumers and public generally. With these results no fair-minded citizen can quarrel.

Research Needs in Land Tenure and Farm Finance†

By G. H. AULL*

THE problems of land tenure are both broad and long. Their roots are deep in the earth and firmly imbedded in the customs, traditions and emotions of the people. Plain common sense forces the conclusion that they can be solved only by determined effort and the exercise of great patience.

As viewed by one writer,¹ land tenure has three indispensable dimensions: (1) the nature and scope of the rights in land; (2) the physical resources over which these rights are exercised; and (3) the period for which they are held. More precisely, it may be observed that within the term "land tenure" there is encompassed all of the complex host of relationships growing out of the ownership and use of natural resources. Thus, in a very real sense research in land tenure must concern itself with an analysis and appraisal of rights in land varying all the way from *outright* public ownership under which individuals hold no rights except those granted by society to *exclusive* private ownership under which the public holds no rights except those reserved by society. In regard to the latter, society has traditionally reserved for itself three limited but important rights—(1) the right to tax, (2) the right to police, and (3) the right to acquire for public use. The rights of private owners, on the other hand, are exceedingly broad, including among other things the right to use and to abuse, to buy and to sell, to bequeath and to inherit, to subdivide and to enlarge, to mortgage and to foreclose.

But governments and freeholders are not the only parties having rights in

land although under most circumstances others acquire and hold their rights only through sufferance of the legal owners. Once assigned, however, such rights assume important proportions and give rise to numerous problems. What, for example, in the absence of specifically stated contractual agreements, are the rights of mortgagees and of sharecroppers? Assuming greatly unequal bargaining power on the part of the different parties to such agreements, what rights, if any, should be guaranteed as a matter of public policy? If society provides the means to supplement a farmer's income and to protect him against the loss of his property during periods of depression, how far should society go in preventing him from making a fool of himself during periods of prosperity?

These are but a few of the questions which cannot now be answered, not primarily because they involve difficult and complex matters of public policy on which there are wide differences of opinion, but largely because the facts essential to any reasonably adequate answer are not now available. For example, at precisely what price and with what specific combination of conditions does an investment in farm land become speculative rather than safe? Other broad questions the answers to which must wait both for an accumulation of fact and a crystallization of opinion are: (1) To what extent, if at all, should society prevent the abuse of privately-owned land? (2) Are the terms and conditions of farm land sales and use

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¹ Marshall Harris, "Objectives of Land Tenure Policy," (From *Caribbean Land Tenure Symposium*, Caribbean Research Council, Washington, D. C., 1946), p. 49.

† This paper was originally prepared as basis for discussion at the Farm Finance Conference, Athens, Georgia, April 9, 1947.

matters for the exclusive determination by the purchaser and the seller? (3) Does the unrestricted right of bequest make for a sound agricultural economy? (4) Is it of any concern to society whether agricultural land holdings are split up into uneconomic units or concentrated into large estates? (5) Does the public have an interest in avoiding a situation in which farms are overburdened with debt and repayment plans exact too heavy a burden on farm family living? (6) Is the tenant the only sufferer when the rent is too high and the period of tenure uncertain?

While the job of the research worker is certainly not that of policy maker, he does have a responsibility to provide the facts on the basis of which policies can be determined. Unfortunately, policies have been and are being determined both positively by direct action and negatively through failure to act. These processes will go on either with or without benefit of accurate, scientific information but obviously they will proceed more intelligently and with promise of greater ultimate success if at least a minimum of the research needed can be accomplished.

Before passing to a consideration of some of the more urgent research needs, however, it might be well to look briefly at some of the apparent objectives of land tenure policy as they have worked themselves out over the years in not only the United States, but in some of the older countries of the world. As listed by Marshall Harris,² they are: (1) Responsible freedom of personal action. (2) Equality and dignity for all tenure groups. (3) Secure possession and equitable distribution of rights in land. (4) Conservation, development, and efficient utilization of resources. (5) Equitable distribution of income. (6) Well integrated community life. These, by common

consent, are goals to be sought. They constitute the "yardstick" by which research should undertake to measure existing tenure conditions and to evaluate proposed tenure programs. Research is needed, also, to implement these goals, to point the way to their attainment and to hasten the day when they may be more fully realized.

"Historically the approach in land tenure research has been closely related to problems.³ In the beginning it was on property and rent concepts. Even in Biblical statements there is reference to property. Henry George, John Stuart Mill, and others gave considerable thought to property. Malthus, Marshall and others influenced the concept of property rights.

"Later Richard Ely redefined it when he said, 'Land tenure as a part of land economics deals mainly with the human relationships involved in systems of property rights and with the effect of those relationships upon the utilization of natural resources.'

"George S. Wehrwein, in the Scope and Method series, defined land tenure as 'all the relations established among men, determining their varying rights in the use of land.' He said further, 'Private property rights in land may be divided among several persons. This is the basis of the entire tenure problem.' Thus, 'land tenure research is concerned with a study of the distribution of rights in the use of land, and the consequent effects of the distribution of these rights in various forms on the social and economic welfare of individuals and society, both present and future.'

"Land tenure research as thought of at the present time has to do with the problems among men resulting directly or indirectly from holding and transferring rights in landed property. This includes problems involved in concentration, segmentation, parcellation and evaluation of land.

"Since all parts of the universe are somehow associated with all other parts, no segment of knowledge can be exclusive unto itself. This means that land tenure problems are inextricably intertwined with other phases

³ This and the succeeding five paragraphs have been copied verbatim from a Report on *The Land Tenure Research Workshop*, August 12-24, 1946. Released by the Farm Foundation, Chicago. (Mimeographed).

² *Ibid.*, p. 34.

of economic and social life and with other sciences. There is a relationship to law in discerning property rights; to sociology in the sociological impacts of tenure systems; to farm management in the organization of the farm or developing a lease to insure good husbandry; to political science in providing individuals freedom and security through property rights; to farm finance through the role of credit in achieving control over rights in land; to soils, agronomy, husbandry, and other physical sciences as tenure systems affect crop yields, soil maintenance, erosion and the building up and maintenance of land, herds and flocks.

"Land tenure research has to do, therefore, with problems of property and with relationships between men about property. The problems which are the area between present situations and desired goals, consist of confusions, conflicts and uncertainties from public or private points of view in the holding, transferring and valuation of rights in land. These problems arise from:

(1) *Land exchange*—the exchange of ownership rights.

a. Landownership—the owners among whom rights are exchanged.

b. Land values—the level at which rights are exchanged.

c. Land transactions—the manner in which the exchange is conducted.

(2) *Land tenure*—the splitting of property rights through:

a. Tenancy—between owner and occupier (includes laborer).

b. Land credit—between owner or occupier and financier.

c. Title splitting—between various owners.

c. Public property—between private owner and the public.

e. Land taxation—the levying of taxes on private rights.

f. Land regulations—the limitations of private rights."

Some of the more serious problems associated with shortcomings in the tenure system are: depletion of soil resources, deterioration of improvements, inadequate housing, land speculation, settlement on unprofitable land, excessive farm foreclosures, frequent moving of farm families, unsatisfactory adjustments to community life and institutions,

frequent failure to develop profitable systems of farming, and inequitable sharing of expenses and incomes. These problems, in turn, have developed largely as a result of four basic but heretofore little understood factors. Briefly described, they are:

(1) The disappearance of "free land" and with it the possibilities of successful homesteading.

(2) Increased pressure of population on agricultural land resources due in part to the relative immobility of labor and capital and in part to restrictions upon the freedom and opportunity to work in non-agricultural occupations.

(3) Fluctuations in farm prices and land values so violent that the amount of cotton required to pay a \$1000 debt has varied from as little as five bales to as much as forty bales all within a period of about fifteen years.

(4) Technological developments which, within the space of a few years, have drastically reduced the man labor requirements in agriculture and tremendously enlarged the productive capacity of the individual farm worker.

If these and related developments are not to have serious and permanent effects upon our way of life they must be thoroughly understood and alternative procedures for dealing with them must be worked out. Research directed toward these ends will doubtless take on a variety of forms and be pursued under innumerable project titles. Essentially, however, the basic research needs in land tenure and farm credit fall into relatively few categories.

In the first place, although a vast amount of information is available through the Census, there is needed a very thorough analysis of present tenure patterns together with an investigation of how and why they developed and probable future trends. Current information regarding the farmer's relationship to the land he operates is colored by the Census classification of croppers as independent

farmers and even by the *definition* of a farm. For example, the 1945 Census of Agriculture indicates a substantial increase in the number of farms and in farm ownership in the southeastern states, yet a consideration of the increase in rural residences and suburban gardens would likely suggest a different interpretation than that which will be given to this announcement. Certainly a more careful analysis of these apparent trends is one of the primary tenure research needs at the present time. Unfortunately, however, efforts in this direction have been stymied for lack of funds.

Another field which needs study by the land economist is that having to do with efficiency with which different tenure groups operate and manage farms and maintain soil fertility under different circumstances as to capital investments and mortgage debt. As of today we know practically nothing specific and concrete, for example, as to the relative advantages and disadvantages of an owner-operated farm heavily mortgaged and a tenant-operated farm with a minimum of encumbrances and restrictions. Actually we know very little as to just what is the *optimum* amount of capital required for the purchase and operation of farms of different sizes and types. Not only this, but the number of bankers in possession of data showing when and under what circumstances a machinery loan will pay off is very few indeed.

One of the tragic losses to our agricultural economy and, indeed, to the entire nation is that which results from delays in the transfer of properties through inheritance. A thorough study and appraisal of these losses and the way to avoid them is a primary task of the research worker.

Perhaps no division of the subject of land tenure arouses more interest at the present time than that which is con-

cerned with leasing arrangements. In the first place, nobody seems to know the honest-to-goodness, rock-bottom facts which satisfactorily explain the basis for the old system of working "on the halves." Obviously if a division of the receipts and expenditures on this basis is equitable and fair on one grade of land and with labor of a certain efficiency, it is not fair on a different grade of land and with labor of a different efficiency. Especially, however, in this complicated age, when nearly every farm and practically every farmer presents a distinct problem, the need for a more satisfactory method of allocating the receipts and expenditures is widespread and urgent. We cannot expect to operate a highly-mechanized and well-balanced agricultural business "on the halves," yet as of today we do not have the facts necessary to advise farmers how to apportion the costs and distribute the income in the case of the modern farm using tenant labor. The problem is even more complicated when the tenant also shares in the investment.

Closely related to this there is need for more consideration of the economic and social impact of technological developments and industrialization upon the different tenure groups. For example, if the cotton picker, the flame cultivator, and the combine are destined to force our agricultural operations into large units depending mainly upon hired and perhaps seasonal labor, then we should know it. If farming is to become a part-time or part-family business with the major income derived from non-agricultural employment, we should know that also. More than this, we should begin to think very seriously about whether we want to make of agriculture an efficient commercial business, taking advantage of all that modern science has to offer, or whether we would prefer a type

of high grade subsistence farming where the emphasis would be upon "a good living" rather than net cash income. Perhaps we want to steer a middle course, but in either case it is high time we began to make some estimates, based upon research, as to what would be required to achieve the goal.

While some scattering work has been done on the legal aspects of the tenure problem, there is a vast amount which needs to be done to codify the statutes relating to tenure and to landlord-tenant relationships. In addition, it would be profitable to examine court records to determine the working interpretations under which the tenure system has operated. This type of research is basic to the establishment of any uniform code of laws governing these complex and, at best, difficult relationships.

It has been shown as a result of past research that tenure groups differ markedly in the degree and extent of their participation in social organizations and community institutions. Further studies are needed in order to determine whether these differences are inherent in the tenure system itself and whether they can be overcome without a major change in the traditional patterns of man-land relationships. There is apparently a close relationship between the educational, governmental, economic and social "health" of a rural community and the degree of control which its citizens exercise over the land they operate. We need to know why this is true as well as the extent to which it may explain some of our present difficulties.

Another broad field which is in need of further study is that touching upon the effects of government programs and public policies on land values and farm tenancy. For many years now the efforts of our government have been directed toward measures designed to increase

prices received by farmers and to reduce the percentage of farms operated by tenants. More recently provisions have been made whereby the federal government will provide special assistance to veterans in the acquisition of farms. The net overall effects of these programs have been obscured by other powerful forces but ways and means must be found to measure them and to evaluate their worth if future policies are to have any meaning whatsoever. For example, it is commonly asserted that a tobacco allotment of one acre will add \$1000 to the selling price of that acre. If this is true—and research may be needed to find out—is the new purchaser in a more favorable position, having paid for an allotted acreage, than he would have been had there been no allotment? Or, to put it another way, after all the land affected by a government price-supporting program has exchanged hands—at prices higher than it would have brought without these programs—will not new and super-price supports be necessary to maintain the new owners on about the same level as the old? While economists generally feel that the answer to this question is "yes," they lack much in the way of concrete evidence to support their belief.

Just as additional information is needed as to the effects of federal farm purchasing, price supporting, and tenure improvement programs, so also is research needed to clarify the results of state efforts to improve the tenure situation through such measures as homestead tax exemptions and graduated land taxes. Altogether too little is known in this country regarding ways by which the taxing power can be and is being used either to retard or to accelerate desirable tenure and land-use changes.

Research in land tenure and farm credit lacks much of the glamour which

is to be found in many other areas of investigation. Frequently it involves questions about which there are many differences of opinion—some of it deeply rooted and highly vocal. Even the suggestion that a topic may need study sometimes calls forth a veritable flood of propaganda and may even result in the social scientist being held up as a “reformer,” or perhaps a “Communist.” The results of such investigations, more-

over, however accurate and adequate they may be, will in many cases be received with mixed emotions depending upon the previously entertained views of the public. Thus it takes longer and is more difficult to translate them into action and the research worker has added reason to feel that his efforts may not be appreciated. The need, however, is very great and the rewards—when they do come—very sweet indeed.

Rural Rehabilitation in Washington County, Utah

By EDWARD C. BANFIELD, JR.*

BEFORE 1934, when rural rehabilitation was established as an activity of the Federal Emergency Relief Administration, the century-long, accelerating trend toward a more commercial and more productive agriculture had imposed a decided handicap on those rural areas where resources were meagre and the pressure of population mounted fast. In parts of almost every state, and in some whole regions like the Appalachian-Ozark, rural poverty had long been chronic. Washington County, Utah, was, and still is, fairly typical of these "handicapped" areas and it is closely representative of many isolated communities throughout the West.

Brigham Young sent the first sizable group of settlers to southwest Utah in 1862. His purpose was to turn the upper valley of the Virgin River into cotton fields from which he would obtain "foreign exchange" for trade with the gentile world. The valley came to be called "Dixie"¹ but the cotton venture did not flourish. Neither did later attempts to establish silk, wine, and leather industries. Handicrafts and subsistence agriculture soon became the main support of the valley settlements. Farms were small—seldom more than 40 acres, often as few as five—but they were large enough when production was for home use or for barter in the community. Not until about the time of the first World War did cash trade make substantial inroads on the subsistence economy. Early in the 1920's a branch railroad was

built to within 50 miles of the farming area and at about the same time a transcontinental highway was built through Dixie from Salt Lake City to Los Angeles. The highway brought the County's farmers within a one-day haul of both big markets and it gave tourists, campers, and deer hunters access to the farming communities and to the Zion National Park and Dixie National Forest. The breakdown of its physical isolation did not bring industry, however, and in 1930 half of the County's workers were employed in agriculture.

Dixie's population grew rapidly because of a very high rate of natural increase. Between 1890 and 1930 there was a steady and substantial out-migration and relatively little in-migration. Nevertheless, in those 40 years the population nearly doubled (from 4,009 in 1890 to 7,420 in 1930) and in the 1930's, when job opportunities elsewhere were few, it was increased further by in-migration which exceeded out-migration. In 1940 the County's population was 9,269 and its rate of natural increase continued high, 19.3 per 1,000.

Meanwhile the acreage of irrigated land increased very little. By 1910 the irrigators were using the entire normal summer streamflow on about 13,000 acres; thereafter they could irrigate more only in years of exceptional moisture and at the risk of crop failure, and they never succeeded in harvesting more than 19,500 acres. In 1935 the public range, which had been depleted by about 60 percent

* The writer, formerly an information specialist of the Farmers Home Administration, wishes to acknowledge his gratitude to Dr. Marion Clawson, who as Regional Agricultural Analyst of the Bureau of Agricultural Economics, gave valuable advice.

The measures of borrower status reported in this article were made by the Program Analysis Unit, Region IX,

Farmers Home Administration, under the direction of Louis E. Heaton.

¹ The "Dixie" section includes virtually all of the cropland of Washington County but it is only a small part of the total land area. For convenience the terms "Dixie" and "Washington County" are used in this paper as if they were synonymous.

because of over-stocking and drought, came under the management of the Grazing Service and livestock numbers were reduced by about two-thirds from the 1920 peak. Most of the small operators were forced off the range. The mounting pressure of population on land was not relieved by the tourist industry, which developed after 1930 but insufficiently to absorb the in-migration of that period.

As their isolation decreased, Dixie people more and more came to want the "good things" of the outside world. For these they needed cash—something their subsistence economy did not provide. While farm sizes were decreasing because of the pressure of population, production for cash was supplanting production for home use. This trend was hastened by the building of the highway which connected Dixie with Salt Lake City and Los Angeles and, perhaps, by the Mormon church which after 1920 began to encourage the payment of tithes in cash. By 1934 the County was exporting half its total farm production. But it was also importing agricultural products, and the value of these was two-thirds the value of its exports. The net agricultural surplus was \$165,172—a very small "balance of trade" for a county with 758 farms.²

Under these circumstances, the position of the average Dixie farmer was poor indeed. He had 15.9 acres of irrigated cropland, machinery worth \$94, and farm buildings (exclusive of the dwelling) equivalent to a building 20 x 25 feet and 16 years old. In 1934 his net cash farm income was \$121.³ Off-farm work and other income brought the

total cash income of the average family to \$460. Farm debt averaged \$881 with an interest charge of \$59 in 1933. The average farm dwelling in that year was 27 years old, had 0.82 rooms per person and was worth \$651. Three-fourths of the homes had electricity and slightly more than half had piped-in water. Few had other conveniences.

A large proportion of the Dixie families had far less resources than did the average. Thirty-six percent had farm machinery valued at less than \$35, 46 percent had less than 10 acres of irrigated cropland, and 40 percent had cash family incomes of less than \$200 in the period 1929-33. Many young farmers who could not buy or rent larger acreage were in this group.

The rural rehabilitation program was launched in Dixie early in 1935. It was to proceed as follows:

"After a client has been recommended as being eligible for rehabilitation, the county supervisor will conduct a detailed farm management survey of his assets and liabilities in order to get a complete picture of his situation. A program of operation will be worked out with each client together with a repayment plan. Budgetary estimates will indicate in every case whether or not the anticipated income from the farm set-up will pay the operating expenses of the farm, clothe and feed the family and pay back to the Corporation money that is advanced for the purchase of capital goods. Clients whose plans of operation show such favorable condition will be recommended to the State Corporation. The latter will execute loans to carry on the plan of operation agreed upon by the parties concerned."⁴

This is descriptive of the "standard loan" phase of rehabilitation activity as it has been carried on in the County ever

²All statistics for the year 1934 and for the period 1929-33 are from an unpublished study by the Utah Agricultural Experiment Station, "The Agricultural Resources of Washington County, Utah," which is available at the Utah State Agricultural College, Logan.

³Incomes were unusually low in 1934 because of a severe drought. A study made in 1928 and reported in

Utah Agricultural Experiment Station Bulletin No. 214 showed that a number of typical Dixie farms yielded gross cash incomes averaging \$1,176 and net cash incomes averaging \$493 in that more normal year.

⁴"Rural Rehabilitation, Its Meaning and Scope," C. O. Stott, address given over radio station KSL (Salt Lake City), Feb. 7, 1935 (mimeographed).

since.⁵ These standard loans (operating loans) are made for livestock, equipment, feed, seed and other farm requirements and family living needs and are repayable in from one to five years at five percent interest. They are based on written farm and home plans worked out by the borrower families and the farm and home supervisors. On the basis of these plans the supervisors extend technical guidance in farm and home management as needed. As of July 1, 1946 standard loan advances of \$574,983 had been made to 309 Dixie families.

Other rehabilitation activities carried on in Washington County were as follows:

Emergency Health and Subsistence Grants. Prior to July 1942, approximately 300 families received cash grants totaling \$53,472. Families eligible for standard loans received grants to meet emergency health and subsistence needs which could not be provided for from normal income.

Sanitation Grants. Where necessary to provide materials with which a farmer could screen his house, build a sanitary privy, or install a cistern, small cash grants were made between 1941 and 1942. Sanitation grants totaling \$2,650 were made to 82 families.

Debt Adjustment. A committee of farmers and businessmen acted under rehabilitation auspices as an intermediary to assist debt-burdened farmers and their creditors to reach voluntary agreements for adjustment of debts on the basis of ability to pay. There has been little or none of this activity in recent years and, although it was important prior to 1939, no records of adjustments made are available.

Group Services. Loans have been made to enable individual farmers to join small

neighborhood groups for joint ownership and use of expensive machinery and herd sires. Sixty-nine such groups had been formed and 51 were active on July 1, 1946. Of the active groups, 21 are "bull-rings;" the others share machinery such as threshers, gang plows, fruit sprayers, grain binders, feed choppers and so on. The typical group has about five members, some of whom are not rehabilitation borrowers. Most loans for participation are included in standard loans but 31 farmers have borrowed \$31,187 for this purpose alone. About 350 farmers have participated in group services.

Farm Ownership loans. Long-term, low-interest loans totaling \$41,182 have been made to enable two farmers (veterans) to buy family-type farms and to enable five others to enlarge or develop farms of uneconomic size. The scope of this activity was sharply limited by lack of funds which could be allocated to Utah under terms of the Bankhead-Jones Farm Tenant Act.

Water Facility loans. Since 1940 long-term, low-interest loans have been made for the repair and improvement of water facilities, for the installation of new facilities, and for the development of new water supplies. Forty individual farmers had borrowed \$46,457 for these purposes as of July 1, 1946. Two associations with 92 members had borrowed \$19,977 for repair of community irrigation facilities.

Although many families received more than one type of loan or service and the extent of this overlapping cannot be established, it seems probable that about two-thirds of the Dixie farm families had participated in the rural rehabilitation

⁵ Rural rehabilitation activities of the Federal Emergency Relief Administration were transferred to the Resettlement Administration when that agency was established on April 30, 1935. Early in 1937 the Resettlement Administration was transferred to the Department of Agriculture and was re-named the Farm Security Administration. On

Nov. 1, 1946 the Farm Security Administration and the Emergency Crop and Feed Division of the Farm Credit Administration were merged into a new agency, the Farmers Home Administration. Despite these changes of name, there has been a high degree of continuity in rural rehabilitation policy and administration in Washington County.

TABLE I.—FREQUENCY DISTRIBUTION BY FAMILY INCOME, ALL FARMERS 1929-1933 AND STANDARD LOAN BORROWERS IN YEAR BEFORE ACCEPTANCE: WASHINGTON COUNTY, UTAH

Family Income (dollars)	All Farmers (1929-1933)		Borrowers (Before Acceptance)		% of All Farmers Who were Borrowers*
	Number	(% of Total)	Number	(% of Total)	
1 or more minus..	91	12	3	1	3
0-199.....	212	28	15	5	7
200-399.....	167	22	53	17	32
400-699.....	136	18	87	28	64
700-1499.....	106	14	117	38	110
1500 and over....	46	6	34	11	74
TOTAL.....	758	309

* The data on income distribution are only roughly comparable because of changes in the general income level between 1929-33 and the year before acceptance. There was little improvement in farm prices prior to 1939 but, as indicated in footnote 6, the year before acceptance was 1939 or later for one-third of the borrowers.

program by July 1, 1946. Some had not received loans or grants—they participated in group services or were members of irrigation associations which had borrowed; others who obtained grants did not become borrowers. In the main, however, it was the 309 standard borrowers who were the chief beneficiaries of all types of rehabilitation activity. This group, which comprised 46 percent of all farmers, was the primary object of rehabilitation efforts.

About two-thirds of the standard borrowers were drawn from the upper-income third of the Dixie farm population. Only a negligible number came from the lowest-income third. Most families in the lower-income groups were unable to obtain standard loans because they lacked sufficient land to make rehabilitation feasible.

The average farmer had borrowed 5.3 years on July 1, 1946 and in this time he had improved his position greatly.⁶ His

⁶ The measures of borrower status on which the remainder of this paper is largely based are from an unpublished study by the Farmers Home Administration. FHA took before-acceptance and current (July 1, 1946) information from the records of all paid-up borrowers then farming in the County (105 schedules) and from a random 50% sample of active borrowers (67 schedules). Current

(Footnote 6 continued on page 265)

net worth was almost four times what it had been the year before his acceptance as a borrower. Most of the increase had been invested in farm improvements. Debts had also increased, but not disproportionately.

TABLE II.—ASSETS, LIABILITIES AND NET WORTH OF STANDARD LOAN BORROWERS BEFORE ACCEPTANCE AND ON JULY 1, 1946:—WASHINGTON COUNTY, UTAH

ITEM	Before Acceptance*	July 1, 1946**
ASSETS		
Land.....	\$ 1736	\$ 4761
Buildings.....	849	3236
Farm Equipment.....	465	1432
Home Furnishings.....	192	730
Livestock.....	594	1956
Cash, Bonds and Accounts Receivable.....	84	495
Cash Value, Life Insurance.....	5	95
Supplies on Hand.....	237	831
TOTAL ASSETS.....	\$ 4162	\$13,536
LIABILITIES		
Real Estate Debt.....	892	1302
Farm Equipment Debt.....	218	671
Home Furniture Debts.....	5	2
Other Debts.....	185	267
TOTAL LIABILITIES...	\$ 1300	\$ 2242
NET WORTH.....	\$ 2862	\$11,294

* Averages April 1, 1941.

** Enumerators were instructed to show increases in the value of real property only by the amount of actual expenditure of funds or labor for improvement.

The increases in net worth of course reflected increases in family income. Gross family income was \$1,614 in the year before acceptance. In 1945 it was \$5,544. The increases in income were widely distributed within the borrower group—before acceptance 90 percent of the families had incomes of less than \$1,500 whereas in 1945 nearly 70 percent had that income or more.

TABLE III.—FREQUENCY DISTRIBUTION BY SIZE OF FAMILY INCOME OF STANDARD LOAN BORROWERS BEFORE ACCEPTANCE AND 1945:—WASHINGTON COUNTY, UTAH

FAMILY INCOME (Dollars)	Before Acceptance		1945	
	No.	Percent of Total	No.	Percent of Total
199 or less.....	9	6	5	3
200-699.....	78	45	6	4
700-1499.....	66	38	39	24
1500-2999.....	18	11	72	44
3000 and over	0	0	43	25

High prices accounted for much of the increase in family income, but an increase in the volume of production was also important. The average borrower's cash income from farm production rose from \$913 to \$4,108. At 1935-39 prices the 1945 sales would have exactly twice the value of the sales before acceptance. Thus it appears that the borrower marketed 100 percent more than he did before he obtained his loan and, because

(Footnote 6 continues from page 264)

information was not obtained from collection-only and dropped borrowers (32 cases) or paid-up borrowers not living in the County (31 cases). A current financial statement was obtained from paid-up borrowers who were in the County but not farming (13 cases).

"Before acceptance" refers to the year before the borrower obtained his first loan. The distribution by years of acceptance is as follows:

Year of Acceptance	% of Total	Year of Acceptance	% of Total
1935	6	1941	4
1936	26	1942	3
1937	17	1943	7
1938	6	1944	5
1939	11	1945	4
1940	6	1946(to July 1)	5

of the rise in farm prices, he received a 450 percent greater return.

The borrower's increased production was largely attributable to increases in his crop acreage. Before acceptance the average borrower had 37.8 crop acres; in 1946 the average was 53.8—an increase of 42 percent. Some of the increase was by outright purchase, but most of it resulted from improvements to land which the borrower already owned. Land levelling and the installation of water facilities brought natural pasture under irrigation and made it possible to plant crops which yielded higher per-acre returns. The size of the average orchard increased from 1.6 acres to 2.4 acres and plantings of permanent irrigated field crops increased from 8.7 acres to 11.4 acres.

There was also a significant increase in the value of livestock on the borrowers' farms. Those farmers having livestock increased the value of their stock from \$655 before acceptance to \$2,079 on July 1, 1946. The size of the average herd of beef cattle and of dairy cattle did not increase, but more farmers had each type of stock. There was a sharp reduction in the number of sheep on the farms of borrowers who had sheep before acceptance, and a sharp increase in the number of borrowers keeping poultry and in the size of their flocks.

Despite wartime shortages the borrowers mechanized their farms to a large degree. Sixty-three percent of the borrowers were sharing machinery with their neighbors in 1946 and it can therefore be assumed that increases in ownership of machinery do not fully reflect increases in the use of it.

The borrowers were farming more efficiently than they had before obtaining their loans. Measured by certain indicative farm and home management practices, they had learned new skills

and were giving more attention to up-to-date methods for the care of livestock, conservation of soil, production of crops, and use of irrigation water. The average butterfat production per cow, which is perhaps the best indicator of general efficiency, rose from 157 pounds to 248. (In the Western states the average was 232 pounds in 1943.)

TABLE IV.—POWER MACHINERY AND VALUE OF ALL FARM MACHINERY OF STANDARD LOAN BORROWERS BEFORE ACCEPTANCE AND ON JULY 1, 1946:—WASHINGTON COUNTY, UTAH

ITEM	Before Acceptance	July 1, 1946
Farm Machinery: Av. per farm...	\$465.00	\$ 1,432.00
Average per acre crops....	12.30	26.62
Automobiles: % of total farms reporting.....	26	42
Trucks: % of total farms reporting.....	30	52
Tractors: % of total farms reporting.....	9	35

The borrower's increased income from farm production was supplemented by increased income from outside work. He probably spent less time working off the farm in 1945 than before acceptance but he earned more nevertheless. Higher wage rates had much to do with this increase but part of it is probably to be accounted for by the fact that he was doing custom work for other farmers with his machinery.

The improvement in the farmer's position was reflected in higher living standards for his family. Living expenses doubled. Not much of the added expense was for food; the average family was growing more for home use than before acceptance. Home furnishings and improvements to dwellings accounted for most of the increase. Dixie housewives bought washing machines, sewing machines, refrigerators, and other conveniences they had long been without. Twenty percent of the families built new

TABLE V.—IMPROVED FARM AND HOME PRACTICES AND EFFICIENCY EVIDENCED ON FARMS OF STANDARD LOAN BORROWERS BEFORE ACCEPTANCE AND JULY 1, 1946: WASHINGTON COUNTY, UTAH

ITEM	Before Acceptance	July 1, 1946
<i>Improved Livestock Practices</i>		
1. Purebred Sires Used....	% 5	37
2. Concentrates Fed.....	% 27	56
3. Livestock Shelter Used ..	% 28	54
<i>Machinery Care and Use</i>		
1. Repair Shop on Farm ..	% 10	29
2. Machinery Shelter Used.	% 1	11
3. Co-op. Use of Expensive Items.	% 9	63
<i>Crop Practices</i>		
1. All Manure put on Crops	% 43	84
2. Rotation Plan Used.....	% 36	78
3. Commercial Fertilizer ..	% 29	51
4. Pest & Disease Control ..	% 31	76
5. Quality Seed Obtained...	% 19	71
6. Year-Round Garden	% 70	91
<i>Irrigation Systems</i>		
1. Adequate Water Supply	% 42	70
2. Good Distrib. System....	% 13	58
<i>Home Practices</i>		
1. Cold Storage Locker	% 1	26
2. Yards Landscaped	% 18	58
<i>General Efficiency Factors</i>		
1. Annual Butterfat Yield Per Cow.....	lbs. 157	248
2. Suitable Marketing Out- let Available.....	% 15	94
3. Quarts Food Canned Yearly per Family.....	No. 440	523
4. Lbs. Food Stored Yearly per Family.	No. 618	719
5. Three or More Income Sources.....	% 17	47
6. Record Book Used Regularly.....	% 4	23

homes after obtaining their loans and another 35 percent either moved to better homes or added new rooms. These changes caused the average number of persons per room to drop from 1.7 to 1.05. (A drop in family size accounts for 14 percent of this improvement.)

Forty-eight percent of the borrowers had paid off their loans and were considered rehabilitated on July 1, 1946. Another 10 percent (32 borrowers) were unsuccessful; rehabilitation efforts ceased

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TABLE VI.—PORTION OF STANDARD LOAN BORROWER HOMES WITH VARIOUS CONVENIENCES BEFORE ACCEPTANCE AND JULY 1, 1946: WASHINGTON COUNTY, UTAH

ITEM	Percent Having Convenience	
	Before Acceptance	July 1, 1946
Water Supply in House.....	31	85
Modern Bathroom.....	12	64
Windows Screened.....	49	94
Adequate Storage Space.....	27	73
Electricity.....	68	94
Telephone.....	10	37
Pressure Cooker.....	21	70
Washing Machine.....	65	97
Refrigerator.....	28	76
Sewing Machine.....	65	91

with them and their accounts were classified as "collection-only, or dropped." Further collections are expected from this group but if none are made the total loss (\$5,714) will be 0.8 percent of all

TABLE VII.—COMPARISON OF RESOURCES BEFORE ACCEPTANCE, COLLECTION-ONLY AND DROPPED AND PAID-UP BORROWERS: WASHINGTON COUNTY, UTAH

ITEM	Dropped and Collection Only	Paid-Up
Full Owners (%).....	54	81
Crop Acres.....	19.3	40.4
Value of Livestock.....	\$ 271	\$ 756
Value of Farm-produced Food Used at Home.....	\$ 193	\$ 242
Total Farm Income.....	\$ 367	\$ 973
Net Worth.....	\$1,053	\$2,969

loan advances. As of July 1, repayments by all borrowers were 102 percent of maturities. Total interest payments on that date were \$57,161.⁷

The farmers who failed as borrowers (collection-only and dropped) had less

⁷ Figures on losses, repayments, and interest payments apply to all loan funds advanced, not merely "standard" loans.

TABLE VIII.—ANALYSIS OF INCOME AND EXPENDITURES OF STANDARD LOAN BORROWERS, WASHINGTON COUNTY, UTAH, IN YEAR BEFORE ACCEPTANCE AND IN 1945, AT ACTUAL AND PRE-WAR PRICE LEVELS

ITEM	Before Acceptance	1945	
		Actual	Pre-War*
<i>Income</i>			
1. Crop Sales.....	\$ 387	\$1491	\$ 734
2. Livestock Sales.....	431	2026	1018
3. Livestock Product Sales.....	95	591	297
4. Total Farm Income.....	913	4108	2049
5. Other Cash Income.....	446	1075	363
6. Total Cash Income.....	1359	5183	2412
7. Value of Farm-Produced Food Used in Home.....	243	342	342
8. Value of Farm-Produced Fuel Used in Home.....	12	19	19
9. Gross Family Income.....	1614	5544	2773
<i>Operating Expenses</i>			
1. Cash Farm Operating.....	508	2330	1084
2. Cash Family Living.....	466	928	603
3. Value Farm Produced Fuel and Food Used.....	255	361	361
4. Total Operating Expenses.....	1229	3619	2048
5. Net Income Available for Capital Improvement and Savings.....	385	1925	725

* The following indices, based on 1935-39 were used: all crop sales (Utah) 208, all livestock and livestock products (Utah) 199, farm wages (U.S.) 296 (this was applied to "other cash income"), and family living expenses (U.S.) 164. A weighted index of farm operating expenses in southern Utah was calculated on the basis of FHA farm and home plans in the area. The plans showed feed expense to be 38% of the total and hired labor expense 44%. Indices of 164 and 296 (U.S.) respectively were used. The index for equipment and supplies, 127, was used for other farm operating expenses. The weighted index for farm operating expenses was therefore 215.

resources to start with than did the others. They were also less efficient at the time of acceptance. It is safe to assume that lack of resources and lack of efficiency both were causes of failure and that when the two were associated in the same borrower there was the least likelihood of success. There was no significant difference in the resources and efficiency of the paid-up group as compared with those who were active borrowers on July 1, 1946.

Having doubled their production, the position of the borrowers—who comprise about two-thirds of all Washington County farmers having land for commercial production—is basically improved. If the various items of their 1945 income and expense are expressed in terms of the 1935-39 price level it is evident that as a group they can expect a better living than ever before.

The rehabilitation program had little effect on that 40 percent of all Dixie farmers who lacked land for commercial production. It did not impair their position, but it did not improve it. The subsistence farmers will probably have less employment as farm labor now that the borrowers' farms are mechanized but this loss may be offset by new, higher-paying employment opportunities—such as trucking—which the greater volume of borrower production will entail.

Two-thirds of Washington County's population was classified as "rural non-farm" in 1940. Most of these people are in a high degree dependent on the County's two chief sources of income—agriculture and tourist trade. The *increase* in the volume of production on the borrower farms is equivalent to one-third of the County's total prewar output, and so it is an important addition to the basic productive capacity on which the Dixie economy so largely rests. At 1945 prices the value of this increase was

\$885,000. It will be less as farm prices decline, but regardless of the amount of the decline, it will remain a relatively large proportion of Dixie's total cash income and its influence will be felt on the living standard of most of the nonfarm families in the County.

Further increases in the County's farm production are probable. The rehabilitation program is continuing, and in recent months FHA's authority to make loans for farm purchases and for the enlargement, development, and improvement of farms has been expanded. This should make possible fuller development of existing resources on many farms and, in some instances, consolidation of farms which are of uneconomic size. Although much can be done in these ways to make the Dixie farms more productive, it is probable that equal or greater opportunity lies in improvement of management techniques—in the use of better seed, higher producing livestock, crops which yield high per-acre returns, and in improved management of soil and water. Continuing in these directions the farmers might within a few years double their present volume of production and sales. On the basis of the increased volume of production small, local processing industries might be established.

There is also the possibility that the resource base may be broadened somewhat by the construction of two reclamation projects, one on the Virgin and the other on the Santa Clara, which together would provide water for 16,000 acres of new land and 8,200 acres now inadequately supplied—the equivalent of about 330 60-acre farms. One of the projects would produce 15,000,000 kilowatt-hours of firm power annually—about enough for 10,000 homes or a factory employing 5,000 workers. At 1940 prices, the projects would cost \$11,000,000. Whether they will be approved by

Congress is of course doubtful and at best it would take 10 years to complete them.⁸

Even under the most favorable circumstances Dixie will continue to be a handicapped area. Its handicap consists of an imbalance between population and resources and, although it may partially compensate for this natural handicap by greater efficiency (or mitigate its effect by a return to the home-grown and homemade value standards of the past—a course Dixie people have so far rejected), only a substantial reduction in population will bring about parity with more favorably located areas. Unless there is this reduction, the present disparity will increase with the continuing rise of living standards in the more favored areas.

Unless the industrialization of Utah and California proceed at a very rapid pace there is little likelihood that an important reduction in population will take place within the next decade. Between April 1940 and November 1943, when war industries offered employment, the County's civilian population dropped 19.2 percent.⁹ Men and women who entered military service accounted for much of this decrease, of course, and many of them, as well as many war workers, are known to have returned to the County.¹⁰ During the previous period of high employment—the 1920's—there was out-migration, but it amounted to only 60 percent of the natural increase. During the Depression there was net in-migration. On the basis of this record it seems unlikely that Dixie's present population will be greatly reduced even if employment levels continue high. As long as the birth rate remains at its present level unprecedented annual out-migration will be needed

merely to avoid an increase in population. If jobs should be few in other places, and if Dixie's birth rate should remain high, the population might increase rapidly.

No doubt many Dixie people will accept living standards lower than they might expect elsewhere as the price of participating in what they consider a unique and valuable culture. One could not well maintain that the national government should stand ready to underwrite such a decision, but at the same time it seems evident that in a democracy wide freedom in such matters is desirable. The rural rehabilitation program is improving the opportunities of many of those who wish to stay. The assurance of full employment would improve the opportunities of many who wish to go.

The national trend toward a more commercial and more productive agriculture will doubtless continue with gathering momentum and farmers with limited resources will be increasingly disadvantaged relative to other farmers and other occupational groups. The experience of the rural rehabilitation program in Washington County indicates that low-income farmers with limited resources, if not too far down the scale, can be helped with credit and technical guidance not only to improve their income and living conditions but also to narrow somewhat the gap between them and the more prosperous farmers who have greater resources. However, in some handicapped areas, such as Washington County, it is virtually impossible because of the pressure of population to provide the least-disadvantaged group with

⁹ Joseph A. Geddes, *Migration, A Problem of Youth in Utah*, Agricultural Experiment Station, Bulletin 323, Utah State Agricultural College, Logan, p. 7.

¹⁰ On January 1, 1947 the Utah Employment Service office at St. George estimated the County population at the all-time high of 10,500.

⁸ *The Colorado River, a Comprehensive Departmental Report*, Bureau of Reclamation, Department of the Interior, 1946, p. 159.

a satisfactory land base. In such areas the rate of natural increase is characteristically high and the number of disadvantaged people may increase rapidly. It is easy to say that the answer lies in

migration, but there are powerful forces of circumstance, and of habit, custom and belief which are not easily overcome in a democracy and which cannot be disregarded by economists and others.

Sequence in Variation of Annual Precipitation in the Western United States

By MARION CLAWSON*

IN most of the western half of the United States, annual precipitation is a major climatic factor for the total available supply of moisture largely governs native plant growth, agriculture, irrigation, hydroelectric power production, and many other aspects of economic life. Variations in annual precipitation, from year to year, may be almost as important as the differences in average precipitation from area to area. The frequency and severity of drouths and of their opposites, "wet" years, may have as great an effect as the averages about which these deviations occur. The sequence in which "wet" and "dry" years occur may be particularly important. It is with this latter subject that this paper is particularly concerned.

Normal or average annual precipitation customarily is calculated on the basis of the available weather records. In the western United States these rarely extend for more than 40 years, and in no case extend over 100 years. Many stations have much shorter records. At the best, the available data are for a relatively small sample drawn from the eternity of time, or even a small sample drawn from the present climatic or geologic era. The true average precipitation for an infinite period of time is unknown. Hence it should be recognized that at present any studies of climatic records are dealing with relatively small samples drawn from

a largely unknown universe, and that the results have unknown validity if extended into some future time period. This caution is especially significant when applied to an analysis such as is presented here.

Variation implies a deviation from a normal. Variations in annual precipitation are obviously measured from a longterm average or normal, as far as the latter is known. A study of variability of monthly or seasonal precipitation would necessarily involve the establishment of a normal or expected seasonal pattern.

The present study is confined to an analysis of data on annual precipitation in the 17 western states (those lying in or west of the North Dakota-Texas row). It is recognized that normal seasonal distribution of precipitation, and variations from normal, are highly important. The work involved in adjusting actual annual precipitation to a normally effective annual precipitation would be prohibitive, even if the data were available for such adjustment, which they are not. Moreover, within fairly wide limits the soil acts as a reservoir to absorb unusually large amounts of precipitation and to give it up as plants need it. Many plants in the arid West are able to adjust their growth to the seasonal availability of moisture.

The shorter the period of time and the smaller the area considered, the greater is likely to be the variation in precipitation, but the less important is such variation as does exist. Conversely, the longer the period of time and the larger the area, the less likely will be large variations in precipitation; but the more important will be such variation as does exist.

*Bureau of Land Management, Department of the Interior. The clerical work on this study was performed by employees of the Bureau of Agricultural Economics, and much of the author's early research on this topic was carried on as a member of the staff of the Bureau of Agricultural Economics. The statements contained herein are the author's and not necessarily those of either agency. The assistance of Harold R. Hochmuth is gratefully acknowledged.

These relations of time, area, and variation should be borne in mind in the analysis which follows.

*Frequency of Deviations in Annual
Precipitation*

The first stage in an analysis of variation in annual precipitation may well be a description of the frequency with which variations of stated magnitude occur. A simple frequency distribution for a weather station or a state may not be very helpful, because of the shortness of the available record. If the distribution of variations could be assumed to be statistically normal, such statistical measures as the standard deviation could be calculated and used to describe not only the sample of years for which data are available but also the probable nature of the universe from which the sample is taken. Empirical studies suggest that the distributions are not strictly normal.¹

¹H. R. Tolley, "Frequency Curves of Climatic Phenomena," *U. S. Monthly Weather Review*, 44:634-642, 1916.

There seems to be a tendency for extremely large items to occur more frequently than extremely small items, and the mode lies somewhat to the left of the mean. This relationship seems probable and reasonable. However, the degree of skewness was not great. If it is relatively constant from area to area, the comparative value of the standard deviation as a statistical measure may still remain. In view of the uncertain character of the statistical universe and of the apparent moderately close approach to normality, the standard deviation has been chosen as the best measure of the frequency of deviation from the longterm average.

The frequency, or amount of deviation from year to year, from the longterm average annual precipitation is closely proportional to the state average precipitation (Table I). For 14 of the 17 states the standard deviation was from 14 to 21 percent of the longterm average. In the other three states—Arizona, California,

TABLE I.—AVERAGE ANNUAL PRECIPITATION AND DEVIATIONS THEREFROM, 17 WESTERN STATES; 1886 to 1939

State	Average Annual Precipitation		Standard Deviation 1886-1938	Coefficient of Variation 1886-1938	Average Deviation 1900-1939
	1886-1938	1900-1939			
	<i>inches</i>	<i>inches</i>	<i>inches</i>	<i>Percent</i>	<i>inches</i>
Arizona.....	13.45	14.14	3.6	27	2.79
California.....	23.99	24.21	6.2	26	5.42
Colorado.....	16.49	16.71	2.4	15	2.10
Idaho.....	17.91	17.88	2.5	14	2.14
Kansas.....	26.57	26.59	4.3	16	3.74
Montana.....	14.88	15.06	2.7	18	2.20
Nebraska.....	22.30	22.43	4.0	18	3.13
Nevada.....	8.81	8.52	2.1	24	1.51
New Mexico.....	14.41	14.74	2.8	19	2.23
North Dakota....	16.89	16.74	2.8	17	2.41
Oklahoma.....	31.94	32.36	6.4	20	5.01
Oregon.....	26.92	25.82	4.2	16	3.19
South Dakota....	18.97	19.10	3.2	17	2.75
Texas.....	30.54	30.63	5.9	19	4.80
Utah.....	12.63	13.25	2.7	21	2.11
Washington.....	35.18	33.34	5.8	16	3.84
Wyoming.....	13.93	14.23	2.6	19	1.96

and Nevada—it ranged from 24 to 27 percent.

These results do not conform to many popular misconceptions in the West. The people in many local areas believe that they have an unusually variable precipitation. Extremes of drouth or wetness are frequently cited as evidence. No less a group than the Great Plains Committee has stated that the Great Plains is an area of unusual climatic hazard.² The available statistics do not bear out their or other popular assertions, as far as annual precipitation is concerned. However, annual precipitation in much of the Great Plains is variable around a critical point—that at which successful wheat production begins. In years drier than average, wheat yields are reduced, perhaps to zero; in years wetter than average, wheat yields are high. Relatively small variations in precipitation around a critical point mean large variations in wheat yields. But it is inaccurate to confuse the significance of such variation in precipitation with the amount of variability.

Possible Patterns in Variability Sequence

The foregoing analysis of the frequency of specified variations from average takes no account of the sequence with which variations of given magnitude and sign occur. There is nothing to indicate whether abnormal years are followed by relatively normal ones, years of high precipitation by years of low precipitation, or whether years of high precipitation tend to occur in sequence, or whether some other pattern exists. To anticipate the later discussion, it makes a great deal of difference whether high and low precipitation years alternate or occur in sequences ("bunches"). There are several possible patterns:

(1) *Complete Randomness.* Sometimes a high precipitation would be followed by a small one, sometimes by an average one, sometimes by another high one. Although short sequences would occasionally occur, they would not be numerous. This assumption was employed by Blumenstock.³ In the absence of any evidence to the contrary it is a reasonable one; in any event it is a convenient one for statistical analysis.

(2) *Alternation of High and Low Years.* This idea is held frequently by people who state that precipitation next year must surely be high (or low) because it has been low (or high) in the past year or years. Carried to its extreme, this pattern would mean complete alternation of above- and below-average years.

(3) *Periodic Cycles of Simple or Complex Pattern.* There have been numerous disciples of "cycle" doctrine. Cycles can be fitted to any series of variable items, if the series is not too long and if sufficiently complex cycles are employed. Although cycle analysis may be used only to describe an historical series, few analysts or their readers can resist the temptation to extend the cycles forward for prediction. The flexibility of analysis possible by adding more complex forms of cycles disappears when they are extended into the future; then the results become rigid and inflexible.

(4) *More Complex Repetitive Patterns.* Bean has identified several complex climatic sequences which have been repeated two or three times in recorded history with amazing faithfulness.⁴ As he points out, the chance of such a complex climatic sequence repeating itself so nearly exactly is so small as practically to rule out pure randomness as an

Analyzed by Means of the Theory of Probability, U. S. Department of Agriculture Technical Bulletin 819, 1942.

⁴ Louis H. Bean, *Crop Yields and Weather*, Miscellaneous Publication No. 471, U. S. Department of Agriculture and U. S. Department of Commerce, February 1942.

² The Great Plains Committee, *The Future of the Great Plains*, Washington, D. C.: Government Printing Office, 1936.

³ George Blumenstock, Jr., *Drought in the United States*

explanation. What may cause the original pattern of sequences, and what may cause its repetition, is unknown.

One might analyze the available data on annual precipitation by using any one of the pattern types as a working model or hypothesis. For instance, he could search for certain sequences of high, low, and average precipitation years. How many years does it take to make a "sequence," and how much divergence from the original pattern is permissible in "repetitions"? These and other troublesome questions would arise in "sequence" analysis. As previously stated, cycles can be fitted to almost any series of variable items. But how close is the "fit," and does it justify the use of the formula needed to get it? A large measure of erraticness is characteristic of unsmoothed precipitation data, but how much deviation from a tentative hypothesis is permissible?

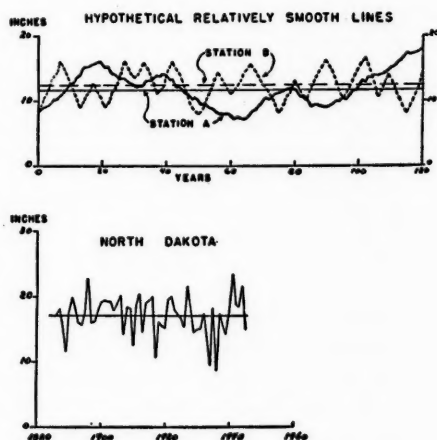
A New Measure of Sequence in Variations

The need is for some measure which will describe the existing sequence of variations but at the same time not dominate the result. If cycles are assumed to exist, the resulting analysis will show "cycles," perhaps badly fitting ones; if sequences are assumed, the resulting analysis is likely to reveal at least some sequences. Something is needed which will do for a time series what the standard deviation does for frequency series. The latter provides an approximation—often a very good one—to the amount of variation in the statistical universe from which the sample was drawn. If a frequency series contains enough items, it is unnecessary to calculate its standard deviation; merely counting the number of items falling within specified limits will give the same results as are obtained by use of the standard deviation. Of course, the labor involved would probably be

vastly greater. Similarly, if a time series were sufficiently long and if there had been no change in the basic underlying situation, one could count the number of times that any combination of items appeared. For instance, how many times in 1000 or in 5000 years did an annual precipitation above average occur four years in succession? Aside from the labor involved, such an approach is impossible for weather data because of the shortness of the available record. Can some method be devised which will give an approximation to the desired results, and that will be applicable where only limited data exist?

If the year-to-year changes in precipitation were relatively small but the changes from one period of years to another were relatively great, the line representing annual precipitation on a chart would be relatively smooth, with sweeps upward and downward but without numerous large sharp breaks or changes in direction. This situation is shown for two hypothetical stations in the upper half of Figure 1. If such were the case, the character of such a time series might be described in either of two ways:

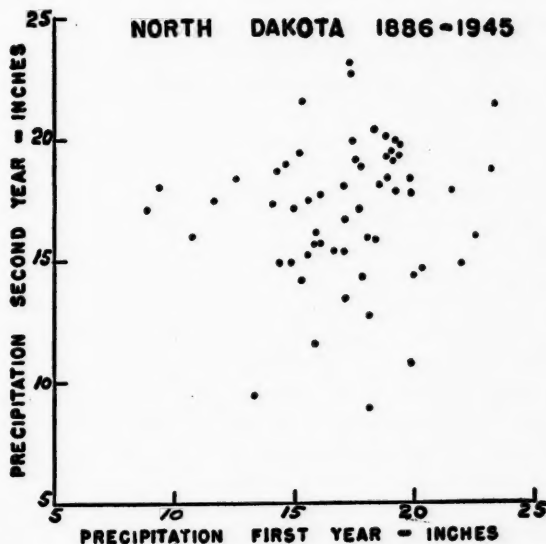
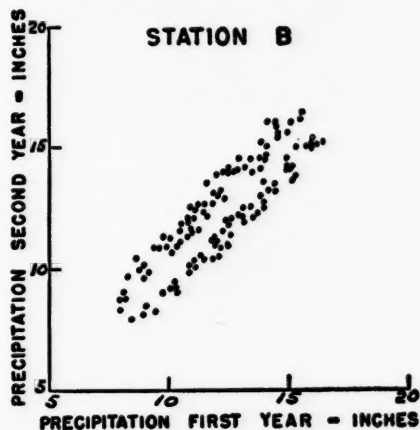
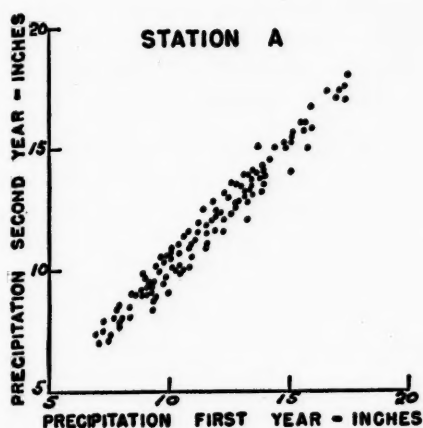
FIGURE 1. ANNUAL PRECIPITATION



(1) By the correlation between annual precipitation in one year and annual precipitation in the following year, without regard to sign. In the hypothetical illustration, the correlation at Station A would be consider-

ably higher than for Station B (Figure 2). The higher the correlation, the greater the tendency for years of above-average to occur in sequences and likewise for below-average years. Thus, the correlation for Station A

**FIGURE 2. CORRELATION BETWEEN ANNUAL PRECIPITATION
IN ONE YEAR AND IN FOLLOWING YEAR**



equals or exceeds .95 whereas that for Station B is less than .85. The two rather sharply distinct sets of dots for Station B represent the rising phases of the precipitation fluctuations (upper group of dots) and the falling phases (lower group of dots).

(2) By the number of times the line of actual annual precipitation crossed its own long-term average. In Figure 1 the line for Station B crosses its longterm average 21 times in the same period that the line for Station A crosses its line but 5 times. The fewer the number of times the line crossed its average within a given period, or the longer the average time between line-crossings, the greater the tendency for years of the same sign to occur in sequence.

As a matter of fact, the characteristic shape of the line showing annual precipitation for a station or state is quite different than that shown in the upper half of Figure 1. In the lower half of the same figure is shown the actual record for North Dakota for the period since 1885. The extreme variability from year to year is striking; the curve is "saw-toothed" to an extreme. Either of the above measures would largely fail. The variation from year to year would result in a correlation so low as to be nearly meaningless, as can be seen in the lower half of Figure 2. The erratic character of fluctuations from year to year results in several crossings across the longterm average line, which are fortuitous. For instance, the actual line rises slightly above the average in 1932, 1935, and 1937, to break an otherwise consistent run of heavily deficit years.

Equally striking in the lower half of Figure 1 is the tendency to sequences of above- and below-average years. During the period from 1900 to 1909, each year but one was above average. A substantial surplus of moisture above the longterm average was received in this period—a total of over 17 inches above average for the decade, or 10 percent above the longterm average. In the

1929-39 period, large and nearly unbroken deficits occurred. In those 11 years the cumulative deficit was about 24 inches, or 13 percent below the longterm average.

These large cumulative deficits and excesses of moisture have highly important consequences, as will be discussed later. A consideration of the cumulative nature of the variations in annual precipitation suggests the means of describing the nature of the variability sequence—use the amount of cumulative surpluses and deficits, in relation to the average deviation from normal, as a measure. This process is illustrated in Table II. The average annual precipitation and the annual deviations from it are calculated in the usual way, and totals with and without regard to sign are calculated. The cumulative deviation is also calculated, obviously taking account of signs. In the illustration, the cumulative deviation is always positive because of the large excesses at the beginning of the period. But large deficits might accumulate for this record in later years, and large deficits are found for some other records. The average cumulative deviation, without regard to sign, is divided by the average annual deviation, also without regard to sign. The result is a new measure, the "coefficient of variability sequence," or Coef_{vs} . In this illustration it is 6.49.

Before presenting the actual figures for the Coef_{vs} for various western areas, it seems desirable to discuss briefly some of its characteristics.

(1) It is a measure—the best one the author has been able to devise—of the tendency toward "bunching" of years of the same sign, or conversely it measures the tendency for years of opposite sign to alternate. The larger the Coef_{vs} , the greater is the tendency to sequences; the lower the Coef_{vs} , the greater the tendency to alternation. Its measurement of these tendencies does not rest upon any

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TABLE II.—ANNUAL PRECIPITATION, DEVIATIONS IN ANNUAL PRECIPITATION, AND CALCULATION OF COEF_{VS} FOR NORTH DAKOTA:—1900–1939

Year	Annual Precipitation	Deviation from 40-Year Average	Cumulative Deviation
	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
1900	19.06	+2.32	+ 2.32
1	19.42	+2.68	+ 5.00
2	19.35	+2.61	+ 7.61
3	19.25	+2.51	+10.12
4	17.85	+1.11	+11.23
5	18.89	+2.15	+13.38
6	20.02	+3.28	+16.66
7	14.30	-2.44	+14.22
8	18.56	+1.82	+16.04
9	18.10	+1.36	+17.40
1910	12.53	-4.21	+13.19
11	18.42	+1.68	+14.87
12	20.35	+3.61	+18.48
13	14.65	-2.09	+16.39
14	18.98	+2.24	+18.63
15	19.29	+2.55	+21.18
16	19.88	+3.14	+24.32
17	10.75	-5.99	+18.33
18	16.00	- .74	+17.59
19	15.57	-1.17	+16.42
1920	15.29	-1.45	+14.97
21	19.45	+2.71	+17.68
22	19.88	+3.14	+20.82
23	17.78	+1.04	+21.86
24	17.11	+ .37	+22.23
1925	16.64	- .10	+22.13
26	15.37	-1.37	+20.76
27	21.52	+4.78	+25.54
28	17.88	+1.14	+26.68
29	14.31	-2.43	+24.25
1930	14.90	-1.84	+22.41
31	14.99	-1.75	+20.66
32	17.18	+ .44	+21.10
33	13.43	-3.31	+17.79
34	9.47	-7.27	+10.52
35	18.03	+1.29	+11.81
36	8.83	-7.91	+ 3.90
37	17.03	+ .29	+ 4.19
38	15.33	-1.41	+ 2.78
39	14.15	-2.59	+ .19
Total, considering signs	669.79	.19	625.65
Disregarding signs	669.79	96.33	625.65
Average, considering signs	16.74	.00	15.64
Disregarding signs	16.74	2.41	15.64
Coef _{VS}			6.49

assumption as to the nature of the sequences—i.e., cycles, randomness, etc.

(2) It is a pure number, in the sense that its magnitude does not depend upon the unit of measurement of depth of precipitation—it is the same whether rainfall is measured in inches, feet, or centimeters. In actual practice, Coef_{VS} below 1.5 or above 7.0 are rarely encountered.

(3) For a regular symmetrical cycle, regardless of the cycle's amplitude, the Coef_{VS} is one-fourth of the number of time units (years, for example) in the cycle.

(4) The Coef_{VS}, like most other statistical measures, approaches stability with longer time series. A Coef_{VS} calculated for annual precipitation data covering only 20 years may be greatly changed by a longer record; one covering 40 years is less likely to be changed but is still not stable. In general, a given degree of stability for the Coef_{VS} would be attained only for a period 2 or 3 times as long as for equal stability of the average annual precipitation.

(5) The size of the Coef_{VS} is affected both by the numerator and by the denominator; that is, both by the size of the cumulative surpluses and deficits and by the average deviation from the longterm mean. A series with many highly variable items will have a lower Coef_{VS} than a smoother and less variable series with an equal cumulative deviation. This seems reasonable and desirable; the highly variable series has a large element of erraticness or random variability, whereas the smoother and less variable series is more clearly influenced by the single set of factors which produces cumulative deficits and surpluses.

(6) Though the Coef_{VS} is the best measure yet devised by the author, it is unfortunately somewhat influenced by the place in the cycle, if a regular cycle exists, of the initial year. If a regular cycle exists, the Coef_{VS} will be a maximum if the first year is at the place where the curve crosses the longterm average line, and at a minimum if the first year is at the peak or trough of the cycle. This tendency is reduced as the cycles become irregular and as the length of the record increases.

(7) The Coef_{VS} is influenced considerably by a single abnormal year such as 1905 in Arizona or 1915 in Nebraska and Kansas, when precipitation is 60 percent or more above the longterm average. The deviation of that year influences the cumulative deviation for

several years, probably far beyond its economic importance. Again, a longer record tends to minimize such influences.

Coef_{vs} for the Seventeen Western States

The Coef_{vs} was calculated for 211 selected weather stations in the 17 western states and for the average of each of the 17 states. The results of the latter are shown in Table III, grouped roughly according to geographic area (roughly, since state boundaries do not conform well to geographic boundaries). Figure 3 shows deviations from average for the 1900-39 period, and also the deviations from the same average for more recent years, for three states—North Dakota, with a high Coef_{vs}; New Mexico with a low Coef_{vs}; and Idaho, with a medium Coef_{vs}.

The five states in the central and northern Great Plains each have a high Coef_{vs}—5.0 or higher. No other western state has an equally high one. Deviations, both cumulative and non-cumulative, were roughly proportional to average precipitation in each state. North Dakota is fairly typical of this group. Above average precipitation was common in the first decade or more of the period studied, and below average precipitation in the 1930's. But even between these extremes there was a tendency for high and low precipitation years to occur in "bunches." Since 1940 there has been a sequence of above average years.

At the other extreme are states in the Southwest and Southern Great Plains; there the Coef_{vs} is less than 2.6 in each

TABLE III.—AVERAGE ANNUAL PRECIPITATION, AVERAGE ANNUAL DEVIATION (NON-CUMULATIVE AND CUMULATIVE, BOTH WITHOUT REGARD TO SIGN), AND COEF_{vs}, BY STATES: 1900-39

Region or Area	State	Average Annual Precipitation, 1900-39	Average Cumulative Deviation 1900-39*	Average Deviation (non-cumulative) 1900-39*	Coef _{vs} , 1900-39**
Northern Great Plains.....	Montana	15.06	12.40	2.20	5.63
	N. Dakota	16.74	15.64	2.41	6.49
	S. Dakota	19.10	19.57	2.75	7.11
	Nebraska	22.43	23.77	3.13	7.59
	Kansas	26.59	18.77	3.74	5.02
Southwest and S. Plains.....	Arizona	14.14	6.10	2.79	2.19
	New Mexico	14.74	3.95	2.23	1.77
	Oklahoma	32.36	8.50	5.01	1.70
	Texas	30.63	12.13	4.80	2.53
Mountain States.....	Colorado	16.71	8.81	2.10	4.19
	Wyoming	14.23	6.25	1.96	3.18
	Utah	13.25	4.84	2.11	2.29
	Idaho	17.88	7.78	2.14	3.63
	Nevada	8.52	4.70	1.51	3.11
Pacific Coast.....	California	24.21	22.49	5.42	4.15
	Oregon	25.82	11.86	3.19	3.72
	Washington	33.34	7.87	3.84	2.05

*Disregarding signs.

**Calculated by dividing the cumulative deviation by the noncumulative deviation.

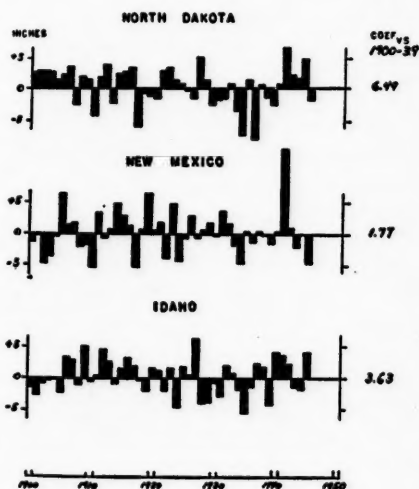
state. Two of the four states have the lowest of any in the 17 western states, and only two states outside of this group have a Coef_{vs} as low as the highest state within it. New Mexico is fairly typical of this group. Both cumulative and non-cumulative deviations vary greatly between the states in this group, and only part of this variation is proportionate to the annual precipitation. There is one sequence of five years below average and two sequences of four years above average, but for the most part excesses and deficits are fully offset within a few years. There is no long sequence of all or nearly all years above or below average, and no large cumulative deficits or surpluses.

The Mountain states have somewhat intermediate values. Colorado, a partly Plains and partly Mountain state, has a Coef_{vs} intermediate between those typical of the two regions. Likewise, the Pacific Coast states are somewhat intermediate, with a fairly low value in Washington and a moderately high one

in California. There is less variation between states in the average non-cumulative deviation than there is in the average cumulative deviation, and the Coef_{vs} hence largely reflects differences in the latter. Idaho has been chosen to represent states with medium Coef_{vs} . The longest sequence is five below-average years. There was some tendency for above-average years to predominate in the early part of the period, and below-average years later; but this was largely offset by the irregular nature of the variation even within these periods.

Since western states are large and mostly do not conform to natural geographic areas, the possibility of substantial differences within states existed. A study of smaller areas is handicapped by fewness of weather stations with long records, particularly for some areas. All stations with continuous records for 1900-39 were used, except where stations were so close together that it was believed the results would be substantially the same. There were 211 weather stations which met this criterion. The number ranged from 5 each in Oklahoma, South Dakota, and Wyoming to 29 in California. There was considerable variation among stations, most of which fitted into regular patterns but some of which did not. The non-conforming stations may represent abnormal time-samples; a longer record might bring them into conformity with neighboring stations. On the other hand, non-conforming stations may represent something basically different. With the paucity of evidence it was impossible to measure the effect, if any, of elevation, average precipitation, or any other local factor upon the Coef_{vs} . Moreover, due to the fewness of stations there were areas in the West where zone boundaries could have been drawn several hundred miles distant with equal apparent accuracy. Where there were a few divergent sta-

FIGURE 3. ANNUAL DEVIATIONS FROM 1900-39 AVERAGE ANNUAL PRECIPITATION, 3 SELECTED STATES

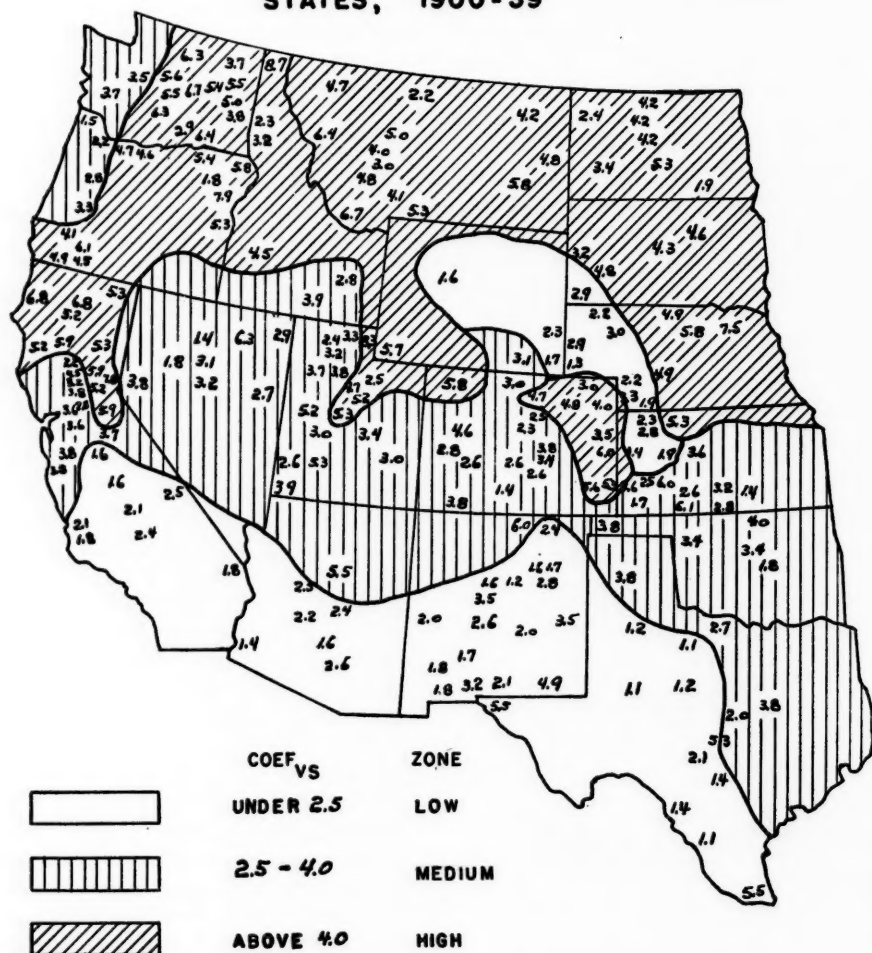


tions the question arose: are these merely non-conforming or do they represent a new zone?

Keeping these limitations and qualifications in mind, it is still possible to delineate broad zones of "high," "me-

dium," and "low" Coef_{vs} (Figure 4). Areas with Coef_{vs} of above 4.0 were arbitrarily designated as "high;" with 2.5 to 4.0, "medium;" and under 2.5, "low." There is a broad belt of "high" stations roughly across the northern third

FIGURE 4. ZONES OF MAGNITUDE OF COEF_{vs} FOR AVERAGE ANNUAL PRECIPITATION IN 17 WESTERN STATES, 1900-39



Figures for individual stations located only approximately.

of the 17 western states. It dips southward along the Sierra Nevada and Wasatch Mountains; swings northward between them and apparently far northward at the edge of the Plains; but far southward again to include most of Nebraska. There is an island in eastern Colorado also.

At the other extreme is the "low" area, mostly across the southern third of the 17 states, but with an island in eastern Wyoming, western Nebraska, and northwestern Kansas. The area between the "high" and "low" is obviously medium, with one island in the Puget Sound-Willamette Valley area.

The small figures on Figure 4 enable the reader to judge for himself the consistency of the Coef_{vs} within the zones. There are several troublesome areas: northern New Mexico and southern Colorado where large and small Coef_{vs} are intermingled more or less indiscriminately; southeastern Oregon, and again in northern Arizona, where there is no station at all for many miles; and various others that might be mentioned.

The analysis presented above is based upon the 1900-39 period. The number of stations with records preceding 1900 was too few to use a longer period. When this analysis was first started, 1939 was the latest annual data available. The unreliability of short-term analysis has been mentioned but should be emphasized again. The experience of 1900-39 may be unique in climatic history and possibly in 100 years all areas will have approximately equal Coef_{vs} . Based upon this period of history, however, the results in Figure 4 are valid. A similar analysis has not been made to include the years since 1939. A visual examination of records for all states, such as is presented in Figure 3 for three states, suggests that the addition of these later years would not change the results ma-

terially. In states where the Coef_{vs} was high, there was a tendency for a succession of high precipitation years. In states where the Coef_{vs} was low, high and low precipitation years were intermingled.

Economic and Social Significance of the Coef_{vs}

The preceding part of this article has analyzed the nature of variability in annual precipitation in the 17 western states. What is the economic and social significance of the variability found?

A major factor in the adjustment of a people to any physical environment is their understanding of the nature of that environment. The agricultural or grazing economy can be adjusted to an extremely wide range of conditions, often permitting approximately equal financial returns per operator even where precipitation is very low.⁵ But if there is a common misconception as to the character of that environment, then adjustment to it must necessarily be imperfect. If the climate is one which easily leads to misconceptions, the problem of adjustment is clearly more difficult.

Where the Coef_{vs} is high there are series of years when precipitation averages above the longterm normal and also series of years when it averages below it. During these years false ideas as to the true character of the climate in the area can easily arise. This was especially true during the first major settlement in an area. Most of the central and northern Great Plains were settled during periods of unusually high precipitation. Settlers often complained that later years did not fulfill the original promise of the area, not realizing that their entry into the area had depended largely upon the unusually favorable conditions of those years. Later, when both favorable and

⁵ John D. Black, "Notes on 'Poor Land' and 'Sub-marginal Land,'" *Journal of Farm Economics*, May 1945.

unfavorable periods had been experienced, the "old-timers," at least, had a better basis for accurate appraisal. But newcomers to the area often fell into the same errors. Direct personal experience might so easily be misleading; if one had known only the 1899-1909 period in North Dakota (shown in Figure 1), he could not help but have a favorable impression of the area. Likewise, the 1929-1939 period would have led to an opposite impression. Ten years is a long time in direct experience of the individual, and those who rely on personal experience were largely misled in the periods mentioned. Though it is outside the scope of this paper, a search of the professional literature would reveal that even those who utilized historical materials and research methods were strongly influenced by contemporary and recent conditions.

Where the Coef_{vs} is low such misconceptions are less likely to arise. Though two or three or even four "good" years may occasionally come in sequence, they are likely to be offset very shortly. A misconception can hardly grow to sturdy size in so short a time, even among those who rely principally upon personal experience. In the recent past, actively within the memory of nearly everyone, will be climatic experience contrasting to that of the current year.

In the western United States, adjustments to variable precipitation may take the following forms:

(1) *Adjustments in Physical Factors:* Conservative grazing, including the carrying of ungrazed forage, cured on the stem; building up of hay and other roughage feed reserves which can often be held over for several years without excessive cost; storage of grain; and storage of irrigation water supplies in reservoirs. In each of these forms part of the supply in unusually favorable years is carried over into the unfavorable years.

(2) *Adjustments in Financial Factors.* When production and income are high, debts can be reduced or paid off completely. Liquid assets may also be accumulated. Capital improvements on the farm or ranch and in the home can be made. In an unfavorable period the accumulated cash and liquid assets can be drawn upon, existing capital improvements allowed to depreciate and no new ones made, and new indebtedness incurred if necessary.

The magnitude and timing of these adjustments, the difficulties of the individual in carrying them out, and the necessary social institutions depend greatly upon the Coef_{vs} . Where it is low, the individual and the group are more likely to realize the desirability of some provision against unfavorable years. It is easier to be an ant than a grasshopper under such conditions. Hay or forage stored in one year is almost sure to be needed within three or four years. Water used to fill the reservoir is likely to be drawn out in a few years, before evaporation has used it all up. Likewise with the other physical adjustments. More important, the reserves so built up are likely to be sufficient for the sub-normal years or at least for a major part of them. In part of the area of low Coef_{vs} , native grasses cure on the stem better than in other parts of the range region and a relatively constant supply of forage can be provided to range livestock if proper management is practiced. Where the Coef_{vs} is low, agricultural operations of all kinds should be adjusted conservatively to the average precipitation, maintained as near there as practical in years of high or low precipitation, and part of the production from unusually good years should be used to offset the deficiencies of the poor years.

The problem is much more complex where the Coef_{vs} is high. The sequence of several favorable years is likely to destroy any inclination to the building up of reserves. Why accumulate reserves which are not needed? As a matter of

fact, reserves of ungrazed forage, hay or other forage, and irrigation water which might be built up during the early years of a sequence of favorable years are *not* needed; moreover, they are likely to be wasted or destroyed before they can be used. Ungrazed forage is usable only for two or three years under the best of conditions; hay deteriorates, loses its vitamin content, and becomes unpalatable; water evaporates from reservoirs and hence disappears. Reserves built up during the latter years of a series of favorable years are likely to be very helpful during the inevitable unfavorable years; but they will scarcely ever be adequate to carry through an extended series of unfavorable years. There is a physical limit to the amount of reserves that can be carried over, and it may be uneconomic to carry as great reserves as it is physically possible to carry. With financial reserves there are somewhat greater possibilities. Money saved in "good" years could be carried over into "bad" years, and fluctuations smoothed out in this way. The hazard to such reserves is psychological; few farmers and ranchers will add to surplus every year for 10 years and not spend all of the unusually high income in anticipation of some distant unfavorable period. Financial reserves may be equally as perishable as physical reserves, their greater physical durability offset by greater psychological risk.

Where the Coef_{vs} is high the psychological hazards and physical difficulties of accumulating and holding reserves probably preclude a program of operation on the basis of average conditions. The moving job of cutting off the peaks and filling in the troughs of the fluctuations ("cycles") is too great for any economic and social machinery yet devised; and, just as the engineers have found that it may be more economical to put more

power into automobile motors rather than to level off every hill and fill every valley, so it may be a more efficient use of natural resources to expand and contract operations with higher and lower rainfall than to try to iron them out completely. When a series of favorable years begins, agricultural operations may be profitably expanded in many ways; and when a series of unfavorable years occurs, they must almost inevitably be contracted. To continue the earlier analogy, there may be still need for much cutting and filling to smooth out minor variations in topography while at the same time accepting the major valleys and hills. If the expansion and contraction are to be economic, they must avoid longterm fixed commitments which cannot be met under other conditions.

The two major problems of agricultural operation in areas of high Coef_{vs} are (1) to devise techniques for economic expansion and contraction, and (2) to recognize turning points, from low to high and especially from high to low. Which land can safely be plowed in favorable precipitation years and allowed to lie idle in unfavorable years without serious soil erosion? Can irrigation economically be expanded in wet years and contracted in dry ones; and, if so, for what kind of crops and types of farming? What livestock breeding and marketing practices can be employed to increase numbers and yet retain the ability to sell above average numbers without loss?

Expansion is probably easier and more likely than contraction when either is called for. When precipitation is above average for two or three years most farmers and ranchers will expand operations. The problem is more likely to become one of refraining from unduly rapid and unduly great expansion than one of encouraging them to expand. The major difficulty will come with contrac-

tion: how to distinguish the beginning of a series of unfavorable years from an occasional unfavorable variation among favorable years, and how secure enough but not too much contraction? The problem of contraction is more severe if expansion occurred during favorable years, but it probably cannot be avoided merely by operation on the basis of long-term averages.

Use of a moving average based upon the known recent past, instead of long-term averages, greatly reduces the Coef_{vs} where the latter is high. This is illustrated by the data in Table IV. The records were analyzed for 17 selected weather stations, scattered over the West, for which 60 years of record were available. Five stations had a Coef_{vs} less than 4.0, the average for the group being 2.36. Measured from the 60-year average, the average annual deviation was 2.73 inches; measured from the average of the three preceding years it was 2.90 inches. For the six stations with Coef_{vs} of 4.0 to 6.9, the corresponding figures were 4.65 and 4.90 inches; for the six stations with Coef_{vs} of 7.0 to 11.0, the figures were 3.56 and 3.90 inches. Thus, there is a clear tendency for the average deviation to be slightly higher when measured from the moving average than

from the longterm average. Examination of individual years shows more years of large deviation. For instance, in a series of above-average years the moving average rises and remains high for two or three years after the actual precipitation falls: similarly when the actual precipitation rises from a series of low years. The moving average of the three preceding years changes direction only after pronounced changes in actual precipitation have occurred creating large deviations at the time.

The Coef_{vs} is drastically reduced by use of the moving average of the three preceding years. For the stations with the lowest Coef_{vs} it is cut from 2.36 to 1.37; for the stations with intermediate Coef_{vs} , from 5.34 to 1.79; for the stations with highest Coef_{vs} , from 8.79 to 1.76. The reduction for stations with a relatively low Coef_{vs} is least, both absolutely and relatively; it is often hard to reduce an item which is already low. The absolute and relative reduction rises as the Coef_{vs} rises. It is interesting and probably significant that the Coef_{vs} , measured from the average of the three preceding years, is relatively constant regardless of the size of the Coef_{vs} when the latter is measured from the longterm average. This conclusion is reinforced by con-

TABLE IV.—COMPARISON OF DEVIATION IN ANNUAL PRECIPITATION FROM LONGTERM AVERAGE AND FROM AVERAGE OF 3 PRECEDING YEARS, FOR 17 SELECTED STATIONS: 1880-1939

Group of Stations	Average Annual Precipitation	Deviations from 60-Year Mean		Deviations from Average of 3 Preceding Years	
		Average Annual	Coef_{vs}	Average Annual	Coef_{vs}
	inches	inches		inches	
5 Stations with Coef_{vs} Less than 4.0.....	11.8	2.73	2.36	2.90	1.37
6 Stations with Coef_{vs} of 4.0 to 6.9.....	18.5	4.65	5.34	4.90	1.79
6 Stations with Coef_{vs} of 7.0 to 11.0.....	16.2	3.56	8.79	3.90	1.76

sideration of the Coef_{vs} for the individual stations included in each group. They range from 1.22 to 2.93 for the stations whose Coef_{vs} was originally 4.0 to 6.9, and from 1.12 to 2.62 for the stations whose Coef_{vs} was originally 7.0 to 11.0. It seems fairly clear that use of the moving average of the three preceding years will reduce the Coef_{vs} to 2.0 in most cases and probably to 3.0 in all cases.

Is it worthwhile to cut the Coef_{vs} from over 4.0 or over 7.0 to under 3.0 or under 2.0 if this means raising the average deviation by 10 percent or less? This is the same as saying: "Is it worthwhile never to have deviations from average of the same sign for more than five years and usually for less if this is at the cost of slightly higher average deviations?" The average, whether longterm or moving, may be considered as a prediction for the next succeeding year. In the absence of any other prediction the average is the most probable value. Is it better to secure the highest possible accuracy in prediction (by reducing average deviation to a minimum) or is it more important to avoid having the prediction too low or too high for several years in succession (as is the case where the Coef_{vs} is high)? The answer to these questions probably depends upon the particular problem but, in some cases at least, it would be better to choose a course reducing the Coef_{vs} .

The moving average will help to detect changes that are more than single year variations from a series of favorable or unfavorable years. It can be supplemented by other devices. The amount of subsoil moisture is a valuable guide to wheat planting in the Great Plains. Although the amount of subsoil moisture and the moving average of precipitation for recent years are likely to be highly

correlated, one may serve as a check upon the other. In much of the West, range "condition" (as reported by ranchers) or forage production from range lands depends almost as much upon precipitation in the preceding year as upon precipitation in the current year.⁶ The density of grass cover in much of the short-grass range area depends upon precipitation in the preceding year but height growth of the grass depends upon precipitation in the current year.⁷ If precipitation is average or below in one year, then forage production the following year can be above average only if precipitation is unusually favorable. Since the effective annual precipitation is mostly received prior to usual cattle marketing dates in most of the Great Plains, cattle marketings each fall can be adjusted, at least partially, to the prospect for forage the following year.

The most efficient use of natural resources in an area of high Coef_{vs} is imperfectly known and extensive further research on the subject is urgently needed. The preceding suggestions are more illustrative than definitive. Not only must various measures be devised, but they must all be tested to determine their real usefulness under the widely varying conditions encountered in different areas.

Coef_{vs} as a Basis of Planning for the Future

This article may well conclude with a little speculation as to the usefulness of the Coef_{vs} as a basis of planning future operations. The earlier qualifications should be reemphasized: the entire analysis rests upon the 1900-1939 experience and has general applicability only to the degree that the 1900-1939 period is a typical sample of climatic history. The future may be very different from

⁶ Marion Clawson, "Range and Livestock Condition in Relation to Annual Precipitation," *American Cattle Producer*, January 1944.

⁷ Enoch W. Nelson, "The Influence of Precipitation and Grazing upon Black Grama Grass Range, U.S.D.A. Technical Bull. 409, April 1934.

the past and may render analyses of the past useless; but now we have no better basis for anticipation of the future than the experience of the recorded past.

By definition, a low Coef_{vs} means that plus and minus variations from the long-term average will be approximately equal within a few years. Regardless of the immediate past, therefore, the expectation is that both favorable and unfavorable precipitation years will occur within the next five to eight years. On the basis of the Coef_{vs} alone, therefore, there is no basis for assuming that any single year or the average of any span of years or the majority of years within any span will be either above or below average. Future annual precipitation may be predictable on other bases; but a low Coef_{vs} can indicate only that either high or low precipitation years will occur in the immediately ensuing years and almost surely be offset shortly thereafter.

With a high Coef_{vs} the situation is different. By definition a high Coef_{vs} means that sequences of high and low years frequently or customarily occur. Moreover, since regular cycles have a Coef_{vs} one-fourth as large as the number of time periods in the cycle, some indication is given of the *average* length of fluctuations. Under these circumstances one should expect extended fluctuations of the same sign—their precise length and the order in which long and short sequences occur are unknown and probably variable. Far from being surprised at a succession of "good" or "bad" years, the farmer or rancher should count on them as normal.

How can one know where the current year lies in relation to these sequences, and what are the odds for above- or below-average precipitation in the next

three, five, or eight years? Admittedly, hindsight is easier than foresight, but on the basis of historical record it is possible to identify certain type situations:

- (1) After several years whose average is appreciably (say 10 percent or more) above or below the best estimate of the longterm average, when a few years of intermixed character appear, the odds are for the beginning of a new sequence of opposite sign. This situation may be illustrated by reference to the North Dakota record in Figure 3. By the end of 1941 a guess might have been hazarded that the sequence of the below-average precipitation years that began in 1929 was ended; by the end of 1942 this guess would have been considerably strengthened. The present author in June 1943, in a document of restricted circulation, in speaking of areas with a Coef_{vs} of 4.0 or above, said: "... probably 3 to 6 years out of the ensuing 5 to 9 years will be above average. The odds for an above-average year are thus probably 3 to 2 at least, to 5 to 1 at the best. These are simply *odds*; they are no assurance that 1943, 1944, or any other particular year will be above average."⁸ In this case, at least, the use of the Coef_{vs} produced accurate results, for the above-average years shown for North Dakota in Figure 3 were generally matched by similar results for other areas of high Coef_{vs} . It is now possible to suggest that by the end of 1930 the probability of a series of low years should have been forecast; the earlier above-average years had run a fairly long sequence and had been more or less terminated by the relatively low years of 1925-1926 and 1929-1930. Even had the present scheme of analysis been made in 1930, this conclusion might not have been reached for two reasons: (A) The analyst might have been fooled by the 1917-1920 sequence and thus refused to accept again evidence no more convincing than would have existed in 1930; and (B), in 1930 the longterm average would probably have been estimated higher than its present estimate so that 1923 and 1924 would also have been below average, possibly leading to the conclusion that a moderately short sequence of unfavorable years had just passed.
- (2) If a sequence of years averaging above or below average does indeed seem to be under way, in the year or two or three following the situation described above confidence in the nature of the sequence and in the character

⁸ Marion Cl. Wilson, "Economic Use and Administration of a Fluctuating Forage Supply," *Second Preliminary Memorandum*. Bureau of Agricultural Economics, Berkeley, California. Processed for limited distribution, June 1943.

of the next ensuing years increases. But the question now becomes one primarily of the length of the sequence. In the example above, by 1944 it was obvious to anyone that a sequence of above-average precipitation years was under way and by 1933 it was equally obvious that a sequence of unfavorable years was under way. In the latter case we know that the sequence continued for six more years. Has the sequence of the early 1940's been broken by 1945, or will it, too, continue for several more years?

(3) If the sequence of above- or below-average years continues, with or without minor interruptions, until it is obvious to all that there has been a relatively long sequence of this type, the only change can be toward years of the opposite type. The longer the sequence continues unbroken, the greater the odds that in the next year precipitation will vary in the opposite direction from the long-term average. A sequence of above- or below-average years may suddenly cease and a sequence of the other type begin; a more probable change is to a period of intermixed years. The odds for the next few years, judged from the vantage point of the close of a more or less unbroken sequence of above- or below-average years, are probably for about average precipitation, with good and bad years intermingled.

A fair question may be: on the basis of the Coef_{vs} analysis, what are the odds for above- and below-average precipitation in the years immediately following 1946? Even if one ignores the brief his-

torical basis on which the Coef_{vs} analysis rests, it should be agreed that accuracy or inaccuracy of a single forecast is *not* an adequate test of a system of analysis. But, casting caution to the winds, here are the *odds* for the years following 1946 in the zone where the Coef_{vs} is "high" (above 4.0):

(a) For 1947-1949, possibly for 1947-1951, above-average years on the whole—probably two out of three or three out of five, or maybe a little higher; the odds for above-average years greater for the early years in this period, and smaller for the later years. It seems unlikely but by no means impossible that these three to five years will be as uniformly "good" as the 1940-1945 years but there should be a preponderance of "good" years until this period closes.

(b) For the period beginning somewhere around 1950 to 1952, and lasting for perhaps four to six or even more years, approximately equal numbers of above- and below-average years. The more consistently above-average years occur in the foregoing period, the longer will be postponed the beginning of this period.

To the extent that the Coef_{vs} analysis can be refined, and to the extent that a longer historical record gives more validity to the figures, the whole process of expansion and contraction to meet fluctuating annual precipitation can become less risky and more accurate.

Farm Inheritance Practices in Austria

By BUIS T. INMAN*

AMERICAN farm owners and their prospective heirs are faced sooner or later with the problem of deciding how their farms shall be transferred from one generation to the next. Students of land tenure and the public in general are interested in this problem from a broader viewpoint namely, its effect on farm families, size of tracts of land, indebtedness, and rural communities.

Many of our tenure practices, including that of land inheritance, were developed from foreign customs and particularly those of European countries. Further review and study of European tenure practices should be helpful in providing some additional ideas that can be adapted to our needs. The purpose of this article is to examine the farm inheritance practices of Austria, particularly those associated with "closed" inheritance, and to evaluate some of the effects of these practices on the tenure pattern of Austria.

Austrian farmers have been faced with some of the same farm transfer problems as those which confront American farmers, such as equal division among heirs, small-sized tracts of land received by each heir, settlement price, care of parents, and mortgage indebtedness arising out of estate settlements. The ways by which the Austrians have attempted to solve these problems should be of interest to farm owners and students of tenure in this country. In most instances Austrian farms are transferred through inheritance.¹

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Austria a Country of Owner-Operated Family Farms

Austrian farmers have much in common with American farmers from the standpoint of the tenure pattern. Austria is a country of owner-operated family farms. Of the 487,000 farms, 65 percent were operated by full owners, 31 percent by part owners, and only 4 percent by tenants, according to the 1939 German Census of Agriculture. Approximately 79 percent of the farm land is owner-operated, 19 percent part-owner operated, and only 2 percent tenant-operated. There are some large estates although they are the exception. The average size is 42 acres with 25 percent in crops, gardens, and vineyards. The size of farms in Austria is relatively large for Europe.



Major changes have taken place over a long period of time in western Europe in farm inheritance practices. Austria has not been exempt from these changes. Through changes in customs and through legislative action, family farms are being passed on to one heir without either sub-

¹ Although specific data are not available for Austria, it is estimated that from two-thirds to thirteen-fourteenths of the farms in Germany were subject to closed inheritance before the Nazi upheaval. H. W. Spiegel, *Land Tenure Policies at Home and Abroad*, University of North Carolina Press 1941), p. 132.

division or excessive debt. The principal motives behind this development, according to Van Haastert, are to maintain a strong peasant class, to provide farms of adequate size for operation, and to prevent excessive indebtedness of agricultural lands.²

Origin and Early Development of Austrian Inheritance Practices

Germanic Law. Except for the central and southern areas, where Slavic tribes entered from the southeast, most of Austria was settled by Teutonic people. (See map showing national and provincial boundaries). Lower Austria and Burgenland were settled by the Franks, also a Teutonic tribe. (It will be noted later that these different peoples affected the inheritance practices that were developed over Austria). Germanic law, which is based on Roman law, came to be adopted through the Teutonic people.³ Thus from Roman law the practice of passing on the land to heirs and the use of the will were developed. From Germanic law, closed inheritance was developed, particularly as a means of passing on the small peasant-holding to one person.

As early as the thirteenth century, while the feudal system still prevailed, laws were in effect in western Austria which regulated farm inheritance. At that time a law permitted the farm owner to designate one relative as heir. Another law covered the designation of an heir by court in case one had not been designated before death of the owner. The land of the farm owner was incorporated into the lands of the feudal lord if there were no relatives surviving to receive the farm.

Granting of Ownership Rights. Under reign of Maria Theresa codes were

adopted which confirmed the peasants' hereditary possession of the land, granted rights to transfer these holdings, limited the number of days the peasant must work for the lord, and deprived the lord of his judicial powers. Serfdom was abolished in 1781 by law; however, it was slow in disappearing from actual practice.⁴ In the 18th and as late as the first part of the 19th century land in the Austrian Monarchy was generally still farmed by the peasant who was granted use of the land he farmed in return for certain dues and services to the proprietor.

After 1798 peasants were permitted to buy their land but few had the funds with which to do this. During this time land was held, except in Tyrol, in two ways—actual ownership, and ownership of the rights to use it. The peasant who held only the hereditary rights to use the land was obliged to bequeath his land intact to his heir who had to pay off other legatees in money. At this time the law prevented the dividing up of holdings in order to prevent further parcelling of the land. The peasant could name his own heir, who had to be acceptable to the lord unless he could prove the proposed heir incapable of farming the land. If no heir were named the eldest son took over the holding. Until the last decades of the 18th century only nobles and the church could hold estates.⁵

Early Tyrolean Law. In Tyrol the peasants had long been equal with other classes of land owners before the law. They were free land-holding peasants. In other provinces some peasants had taken advantage of the law which permitted them to buy full rights to the land held by the lords and thus they also held their land free very early.

² H. Kallbrunner, "Law Relating to Family Claims," *International Review of Agricultural Economics*, 1924, pp. 157-160.

³ Jerome Blum, "Land Tenure in the Austrian Monarchy Before 1848," *Agricultural History*, April 1945, p. 89.

⁴ *Ibid.*, p. 90.

⁵ H. A. M. Van Haastert, "The Evolution of the Agricultural Inheritance Law," *International Review of Agricultural Law*, 1940, Vol. 1, pp. 149-164.

A land law was effected in the alpine province of Tyrol in the 16th century which forbade the subdivision of a farm below a size that would support a farm family. Although this law was not very definite it marked the beginning of legislation for controlling the breaking up of farms into uneconomic size units. The provisions of this law of succession were soon adhered to generally in Carinthia also, an adjoining province in the alpine region of Austria. It gave sanction to the practice of primogeniture in regard to small peasant farms.

*National and Provincial Inheritance Laws**

Specific laws on farm inheritance have been invoked by the Austrian national government and by the provinces of Tyrol and Carinthia. In the other provinces where specific inheritance laws have not been introduced, similar practices have been introduced through custom.

National Law of 1889. From the experiences primarily of Tyrol and Carinthia the idea of restricting subdivision of family farms was incorporated in 1889 into a definite national law that regulated the types of division which could occur in holdings of medium size. This law met opposition immediately in provinces where subdivision was still the common practice. Therefore, it was enforced only in areas that had previously practiced non-subdivision, principally in Tyrol and Carinthia. This law gave national sanction to the idea of non-subdivision even though it was seldom enforced. The provincial laws of Tyrol and Carinthia were much more specific and had the added influence of enforcement.

Tyrolean Law of 1900. A more definite law of succession than that of the 16th

century was invoked by the province of Tyrol in 1900 which regulated the inheritance of family farms. Tyrol had been the only province to give full support to the national law of 1889. This law provides for closed inheritances and requires that a farm cannot be changed in size without permission from the proper authority of the government. The owner is required to appoint one person as the recipient of the entire farm. The farms affected must have a dwelling house and must be registered in the farm section of the land registry book (*Grundbuch*). Governmental approval is necessary in order to change the size of registered farms, or to add to or remove farms from the registry book. Only medium-sized farms whose average production will support a family of five people are affected. Such farms with accessories fall to only one person and he in turn decides who will succeed himself. Thus the farm passes on to one person who becomes the legal successor. The owner designates an heir to the farm, according to local custom. If the heir is not so designated the law provides for the order of eligibility of relatives to inherit the farm. Accordingly, the nearest relatives come first in the list of eligibles, males are given priority over females, and the oldest comes first if the law has to decide. The wife of the possessor of the farm can become the heir if there are no offspring.

The designated heir is required by the Tyrolean law to make payments to the coheirs within three years of the transfer. The court, or the one making the award to the other heirs, decides what is necessary from the estate and the farm income to maintain the farm and a family of five persons. The balance becomes available for payment to the coheirs. In instances where some of the relatives are to live on the farm, the division can be made at a later date. The designated heir is given

* This section and the following one were developed in large part from Harald Schochl, "Oesterreichs Landwirtschaft, Gestalt und Wandlung, 1918-38," *Reichsmachtstand*, Berlin, 1938.

the privilege of deciding when the division will be made. If he sells the farm within six years after receiving it, and a settlement had not been made with the coheirs before the sale, he is required to pay them the excess where the sale value exceeds the use value established for the farm.

The owner of land that is not contained in a registered farm is at liberty to dispose of it as he sees fit. This permits the free transfer of tracts both too large and too small to be classed as family farms.

Inheritance Law of Carinthia. Only a statement of desirable practices regarding succession was provided in the province of Carinthia until a special inheritance law, which grew out of common inheritance practices, was introduced in 1903. It also, similar to the Tyrolean Law, applies only to medium-sized farms of at least 7.5 acres (3 hectares) that are capable physically of providing support for a family of from 7 to 28 people. The right of primogeniture was also established by the law.

The principle of equitable subdivision of the estate was not discarded. This is evidenced by the fact that the heir to the farm can become debtor to the other legal heirs in an amount not to exceed the debt-free value of the farm. The heirs are to determine the amount that the recipient of the farm shall pay; if they do not agree, the court decides. This amount is not to be set so high that he cannot pay—neither can it be lower than the inheritance tax evaluation. This law is much less inclusive than the Tyrolean Law and was designed primarily to prevent the subdivision of farms.

Law of Family Claims. The practice of subdividing farms in the settlement of estates became more prevalent during the period of severe currency inflation that followed immediately after the end

of the First World War.⁷ Because of the extremely rapid decline in the value of the krone, cash payments were practically useless and subdivision of physical property was necessary to permit equitable settlement of estates. A national law (law of Family Claims) was passed after the currency was stabilized to cope with such problems. The main object of the law was to revalue each heir's claim on the estate in relation to the stabilized currency. No claimant could benefit from this provision, however, if he were in a better economic position than the recipient of the land. Claims arising after September 1, 1922, the date of currency stabilization, could not benefit under this law.

Characteristics of Farm Inheritance Practices

Following is a discussion of the more common inheritance practices that have come to be established by custom and by inheritance laws.

Non-subdivision. In most provinces of Austria, farms customarily are not subdivided through inheritance regardless of whether or not there is a law that prevents the practice. This is almost always true in Styria, Upper Austria, Salzburg, Carinthia, and Tyrol.

The tenure history and development was quite different in the province of Lower Austria, where the Frank tribes settled, than in the remainder of Austria. There the practice is a mixture of subdivision and non-subdivision. Generally the practice in Lower Austria is not to subdivide, although division occurs sometimes in certain types of farms. For example, division of the farm is still the custom in the wine-producing areas of Lower Austria where farming can be profitable on very small acreages. Farms in Lower Austria frequently contain several noncontiguous tracts of land as a result of past subdivision. In such in-

⁷ Kallbrunner, *op. cit.*, pp. 157-160.

stances the land adjoining the homestead may go to one heir, while the other tracts of land are passed on to the other heirs. In this way further splitting up of tracts is avoided.

In Burgenland the general practice is still to divide the farm land through inheritance. This province includes the small area of former Hungarian territory that was granted to Austria after the First World War through the principle of self-determination of peoples. Although the present inhabitants are of German origin, the tenure pattern was developed under the western Slavic influence. Through this influence equal division among heirs was practiced and resulted in land holdings that consist of many non-contiguous tracts of land which hamper farm operations greatly. It is also the general practice to subdivide farms in the small mountain province of Vorarlberg in westernmost Austria.

In all parts of Austria, except Tyrol and Carinthia, the heirs can demand a division of the produce. If there is no will the property can be auctioned off for settlement.

Eligibility to Inherit. The person who will inherit the farm where it is not divided is commonly determined through custom—men having preference over women. The eldest son customarily inherits the farm in Salzburg, Styria, Tyrol and Carinthia while in Upper Austria the youngest inherits. The other provinces have no definite customs relative to age.

Settlement Price. The price that the heir of the farm must pay the other heirs in settling the estate, where the farm is not divided, depends mostly on the productive capacity of the farm in Salzburg, Styria, Tyrol, Carinthia, and Burgenland. In this way the farm is not overburdened with debt.

In Lower Austria not only the productive capacity of the farm but also the

economic position of the yielding heirs is taken into consideration in settling the estate. The individual family situation of the yielding heirs as to cash available, indebtedness, number of brothers and sisters, size of farms they may operate, or other employment, are major items considered in determining the amount of the financial settlement.

In none of the provinces is the market value of the farm used in determining the amount to be paid the yielding heirs. Rather an attempt is made to provide an equitable distribution on the basis of income possibilities for the various heirs and yet leave the farm in a position to continue as a going concern.

Time of Settlement. The heir to the farm is often designated and he takes possession before the death of the parents. This transfer commonly takes place when the parents become too old to operate the farm. The practice as to the time of making final settlement of the family estate varies widely in Austria. The heir may take over and settle with the other heirs immediately or he may settle later. If settlement is to be made later he usually has several years. In Lower Austria any cash payments that are agreed upon must be made immediately in part or in full and the heir is given only a short time to make final payment. In Upper Austria and Lower Austria the yielding heirs are permitted to foreclose on the receiving heir to collect payments due them. In Tyrol, Carinthia, and Burgenland the heir to the farm is permitted to pay the yielding heirs in installments, the time and amount being determined by the parties concerned.

In some cases, interest is paid on the sums due the other heirs. The interest rate is nominal, the upper limit being the rate on savings accounts. Generally in the mountain regions interest is not paid. In Tyrol and Salzburg a mortgage on the

farm to insure payment to the yielding heirs can be collected only through court proceedings if it has been recorded in the land registry book. Land has seldom been sold to satisfy the coheirs.

Provisions for Care of Parents. When an heir takes over the farm before the death of his parents he must make certain provisions for their support, such as money, food, and clothing. This is particularly true when the parents must move either to town or somewhere else on the farm. Such arrangements, commonly referred to as the deliverer's contract, are usually determined by the family group at the time of marriage of the heir on the basis of local custom and are seldom determined by the courts.⁸

Usually an official contract is drawn up which specifies the nature of the care that shall be given the parents. The contract is often very definite as to what shall be furnished the parents. It may state specifically the room they will occupy, the food for each meal, the plot of land they may use as a garden, the rent they will receive, and the kind of funeral at death. Rent payments are usually small and in cash. The contract is usually recorded in the land registry book and is binding on the purchaser if the farm is sold.⁹

In Tyrol, Carinthia, and Vorarlberg, the mother can be forced to move out of the farm house when the husband dies if the designated heir is ready to take over. If she leaves the home, she must be provided for, however.

In Upper Austria, Lower Austria, Salzburg, and Styria, there is a common ownership between husband and wife and either can inherit from the other spouse, or a will may be drawn up to that effect.

The surviving partner must then settle with the children or other eligible heirs. In provinces where there is not common ownership the surviving parent has the prior right to buy the farm before the others are eligible to buy it.

Introduction of the German Hereditary Property Law into Austria

The German Hereditary Property Law of 1933 was applied to Austria soon after the Anschluss in 1938. The succession laws in the two countries were so nearly the same that the law could be introduced without modification.¹⁰ This law specified in general that: (1) agricultural and forestry property sufficiently large to support a family and not over 309 acres (125 hectares) be designated as a family farm (*Erbhof*); (2) the recipient of a family estate could be only one who was a German citizen, of German or German type blood, and who was honorable; (3) a family farm would be taken over undivided by the designated heir and farmed by the labor of the owner's family; (4) rights of other heirs were limited to other capital of the farm—descendants not receiving the farm would get an education and dowry according to the means of the farm, and would be allowed to live on the farm if they got in distress without their fault; (5) the inheritance right could not be limited or withdrawn from the rightful heir by any will or testament of the deceased; and (6) in principle no family farm could be sold or indebted.¹¹

The introduction of the hereditary property law does not appear to have been as revolutionary as depicted by some writers. Spiegel has termed it the "new feudalism" and sees little if any

⁸ The deliverer's contract is similar to bonds of maintenance sometimes used in this country.

⁹ *The Land Tenure Pattern of Koppl and Anif Communities of Land, Salzburg, Austria*, unpublished report of study made by the author and Lt. Charles R. Burt in 1945.

¹⁰ "International Chronicle of Agriculture," *International Review of Agriculture*, 1938, p. 504-E.

¹¹ For a more detailed treatise on this law see, J. K. Galbraith, "Hereditary Land in the Third Reich," *Quarterly Journal of Economics*, May 1939, pp. 465-476, and Spiegel, *op. cit.*, pp. 135-139.

social good in it.¹² The only new principles of inheritance introduced by the law, that appear to be of importance, were the Aryan limitation and the prohibiting of indebtedness. The law did outline much more definite procedures governing inheritance than had been followed before and it applied them to all of Austria. The other provisions of the law were already in practice in very similar form in parts of Austria.

Because of the short time the law was in effect and the previous general practice of non-subdivision, the law had little effect on the Austrian tenure pattern. It was repealed soon after the formation of the new Austrian government.

Closed inheritance practices in Austria have been developed primarily through changes in local customs. In time, local customs came to be clarified through legislative action, particularly to apply where wills had not been made. In the instances where laws were passed that varied to a considerable extent from custom there was a general reaction from the people and the laws were nullified.

Some Effects of Inheritance Practices

A comparison of variations in the tenure pattern among the provinces with different inheritance practices indicates some of the effects of these practices.

Size of Farm. The provinces where closed inheritance has been practiced have much larger farms than those where subdivision has generally been practiced (Table I). It is recognized that much of this variation in size is due to other influences, one of the more important of which is the differences in the quality of the land. However, in comparing alpine provinces where the quality of the land is more nearly equal, it is seen that

Carinthia and Tyrol, where closed inheritance has been practiced longest, have much larger farms than do Styria and Vorarlberg.

TABLE I.—AVERAGE SIZE OF FARMS, BY PROVINCES, AUSTRIA: 1930*

Province	Acres per farm
Burgenland.....	18
Lower Austria.....	30
Vienna.....	31
Upper Austria.....	36
Vorarlberg.....	40
Styria.....	41
Carinthia.....	70
Tyrol.....	95
Salzburg.....	109

*Data from 1930 Austrian Census.

The smallest-sized farms are in Burgenland where there has been an extreme amount of subdivision.¹³ A part of this province lies on the Hungarian plain where grain farming predominates but is hampered greatly by the necessity of using hand tools because of the extremely small-sized non-contiguous plots of land that comprise a farm. Although Burgenland has the highest percentage of productive land of any province, the farm people there suffer from low incomes.¹⁴

A size of farm has generally become established over Austria that will provide similar incomes to farm families.¹⁵ It is felt that through inheritance practices the size of farm has been maintained more nearly in line with a size necessary for the particular type of farming practiced.

Tenancy. An analysis of data from the German Census of Agriculture indicates that the practice of passing on the farm to one member of the family in parts of Austria has resulted in a greater percentage of the farms being operated by

¹² Spiegel, *op. cit.*, pp. 140-155.

¹³ "Agrarian Reform in Austria," *International Review of Agriculture*, 1929, Part II, p. 477.

¹⁴ Howard Fromson, *The Agricultural Problem in Austria*, unpublished report, Vienna, 1945.

¹⁵ Buis T. Inman, *Agriculture in Austria*, unpublished thesis, University of Illinois, 1946, p. 54.

full owners in those areas (Table II).

TABLE II.—PERCENT OF FARMS IN EACH TENURE GROUP BY PROVINCES, AUSTRIA: 1939

Province*	Owner-operated	Part-owner operated	Tenant operated	Other
Vienna.....	36.0	45.9	17.1	1.0
Lower Austria	49.3	47.5	2.9	0.3
Upper Austria	83.0	14.0	2.7	0.3
Styria.....	76.3	18.2	5.2	0.3
Carinthia....	68.2	23.7	7.7	0.4
Salzburg.....	84.3	11.4	3.8	0.5
Tyrol.....	67.6	28.0	4.1	0.3
Vorarlberg....	56.6	39.7	3.1	0.6
All Austria....	64.6	31.0	4.0	0.4

*Approximately 60 percent of Burgenland was incorporated with Lower Austria during the German occupation and the remainder with Styria.

The provinces of Lower Austria, Vienna, and Vorarlberg, where subdivision is commonly practiced, have a lower percentage of full owners than do the other provinces. In these provinces part-owners are very prevalent.

The tenure study in the province of Salzburg indicated that there were two principal reasons for the relatively large number of part-owner operated farms, namely, (1) additional tracts of land are rented in order to obtain a more adequate acreage, and (2) the consolidation of holdings.¹⁶ Frequently farm owners exchange plots of land through renting in order to consolidate their operating units. Both are necessitated by excessive subdivision.

Farm Indebtedness. Because of the extreme variations in economic conditions Austria has experienced in the present century, it is hard to determine to what extent inheritance practices have increased or decreased farm indebtedness. The mortgage indebtedness amounted to about \$15 to \$18 per acre of arable land in 1937 which was similar to the indebtedness of farms in the United States. Because of lower incomes and

consequently less ability to repay, the indebtedness was more of a strain on the Austrian farmer, however.¹⁷

The loans of mortgage banks to farmers did decrease after the German occupation of Austria in 1938. A main reason for this decrease seems to have been the German Hereditary Property Law which limited the security of repayment.¹⁸

Conclusions

The ill effects of excessive subdivision of farm land were first recognized in the alpine areas of Austria where lands were not so productive as in the other areas of the country. The custom of non-subdivision of family-sized farms has halted the splitting up of farms into uneconomic sized units and has supported farm ownership. In other areas where subdivision is still the custom the problem of small farms and non-contiguous strips is generally intensified and creates inefficiencies in farming.

In settling the estate, first consideration is given to passing on the farm to the designated heir with no more encumbrances than it can bear and continue as a going concern. The other heirs received settlements generally on the basis of their relative economic positions and the ability of the estate to pay. The welfare of the entire family group weighs heavily in the settlement. The value of the farm in settling the estate is based upon productive capacity rather than on market value which is usually much higher.

Closed inheritance applies only to medium-sized farms that are considered adequate to support a family. The acreage involved varies with the quality of the land for agricultural purposes. Farms, or tracts of land, larger or smaller than this are not affected.

¹⁷ U. S. Army Forces, Manual M 360-5, Austria, Money and Banking, 1943, p. 48.

¹⁸ Inman, *op. cit.*, p. 46.

¹⁶ Inman and Burt, *op. cit.*

Eligibility to inherit is based in large part on closeness of kinship, and males come before females. The practice is for the eldest to inherit in some provinces, the youngest inherits in some others, while in others there is no definite custom regarding age as a factor in determining succession.

When an heir takes over possession of the farm before the death of his parents, provision is made for the care of the

parents, minors, and other members of the family group. Such arrangements are usually made by the family group on the basis of local custom. Although there are now a national law and two provincial laws specifically restricting farm succession, custom has led the way in introducing new inheritance practices. Through these laws and customs Austria has used its inheritance system to strengthen the family farm.

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Past and Prospective Drainage Reclamations in the Coastal Marshlands of the Mississippi River Delta

By ROBERT W. HARRISON* and WALTER M. KOLLMORGEN**

IN southern Louisiana are found many of the ingredients of what may become large-scale federal reclamation projects. Reports have it that the millions of acres of low-lying marshlands bordering the Gulf can be made highly productive by dikes and drainage ditches and by pumping. These steps are described as simple, in spite of the fact that most pump reclamations in this area in the past failed within a few years. Bordering these marshlands live the Louisiana French, crowded largely onto the natural levees of streams and bayous. Their land base is utterly inadequate and nonfarm jobs are difficult to find. Although these people in the past have not been considered particularly promising settlers for high-cost land, their economic plight is often stressed in promotional campaigns designed to initiate federal reclamations in the marshlands.

Local groups sponsoring reclamation of these marshlands do exist and it is probable that their strength will increase. Another depression will certainly strengthen their case for action. Moreover, a number of federal and state agencies are keenly aware of possible large-scale developments in the area. Not only are they willing to develop the marshlands, they are already identifying themselves as closely with this effort as circumstances and legislation permit. Local support is cultivated in every manner possible.

To anticipate new marshland reclamations in an area where scores of private reclamations were developed and failed as recently as the first three decades of

this century may appear unrealistic. But the history of our public policy, particularly as it relates to public works, suggests that failure to gain certain ends on a local and state level does not preclude federal undertakings to gain the same or similar ends. The widespread failure of early private and state irrigation projects, for example, merely hastened federal participation in this work. Federal flood-control efforts in the lower Mississippi Valley thrived on local failure.

The need for marshland reclamations may be questioned on the basis of future surpluses of agricultural products. But we are now reclaiming many millions of acres of land in the Missouri Valley, the Columbia Basin, the Central Valley of California, and other places. These lands are certainly not being developed because we anticipate shortages in agricultural products. The reason for these programs, which may at first appear paradoxical, can be found in our federal land—and economic—policy. It has become somewhat of a national practice to supply many of the unemployed and underemployed with farms. Ever since the Revolutionary War, particularly during times of stress, those seeking opportunity have been encouraged to develop new lands. When the better lands on the frontier areas disappeared about 1900, the Reclamation Act followed in 1902. At the same time, low agricultural prices and agricultural surpluses have been almost a chronic condition in our agricultural history.

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and aided materially in the preparation of the manuscript. The statements and opinions presented here are personal, and do not necessarily represent the official attitude of the organizations with which the authors are affiliated.

It is not the purpose of this paper to present a case for or against the reclamation of the Delta marshlands in Louisiana. It is assumed, however, that promotion of some kind of federal land reclamation in the area will continue. Effort toward it might be particularly successful during times of economic crisis, when speed in action and results is considered essential. In such a situation, and even in a more slowly maturing program, it should prove profitable to explore the accumulated experience in marshland reclamations. This experience should focus attention on a considerable number of problems that can be anticipated and provided for before another major reclamation program in the marshlands is launched.

The Setting

There is a clear distinction between the marshlands and the swamplands of the lower Mississippi Valley. The marshlands are the grass-covered lowlands lying on and near the Gulf of Mexico. Tree growth is exceptional on these lands and where found consists of a few "chenieres," also referred to as oak islands. The saline waters coursing through the numerous lakes and water passages, and sometimes over the land, are largely responsible for the absence of trees. In the swamplands, which lie north of the marshlands, trees, particularly hardwood forests, are the climax vegetation. These swamplands constitute the main body of the extensive alluvial lands bordering much of the lower Mississippi River. Prior to the construction of the present high artificial levees they were flooded frequently. Flood waters, however, were fresh, continental waters, and therefore not inimical to tree growth, particularly on the fairly well drained, high natural levees.

This paper deals almost entirely with marshland reclamations attempted on

the Mississippi River alluvial lands, or Delta marshlands, near the Gulf and mainly east of Vermilion Bay. This restriction in area is important from the standpoint of soils as well as flood hazard from the Mississippi River and its outlets. The short coastal streams west of Vermilion Bay naturally deposit an alluvium quite unlike that brought to southern Louisiana by the vast Mississippi River system, which reaches into many different soil areas in the interior of the continent. Obviously the flood hazards also differ in nature and scope. The great majority of marshland reclamations took place on the part of the Delta which lies nearest the city of New Orleans. This city, it was presumed, would in part supply a market for truck crops which were to be produced on the reclaimed lands and it was also the center of most of the promotional interests which deal with these lands.

Reports which deal with the Delta marshlands supply only estimates, although rather good estimates, of its total area. Apparently there are nearly 2,800,000 acres of delta marsh. The Soil Conservation Service is now engaged in making new estimates of the acreage in fresh and salt marsh. Many estimates of the acreage of marshes suitable for reclamation have also been made, but these figures must be used with great caution. They range from one-half million to two and one-half million acres. This great spread in estimates results from complications, some associated with the physical setting and others with promotional interests. Even more objective appraisals would vary considerably because in them judgments and estimates must be made regarding such factors as the nature and depth of the soil (or soil-forming materials), nearness to railroads, projected canal patterns, location, nature, and extent of a projected sea-wall, flood hazards

from the Gulf or the Mississippi River, modifications in existing flood-control improvements, and the amount of expenditure justified in terms of land use or alleged social and economic benefits. Most of these factors lend themselves only to arbitrary judgments, similar to cost allocations used on federal multiple-purpose projects, and so the estimates represent little more than guess-work. Nevertheless, optimistic reports are circulated widely, at present as in the past, partly because of real optimism and partly to emphasize the magnitude of an undeveloped agricultural empire.

A few decades ago such reports stimulated the development of several score of pump reclamation projects financed by private capital. Although nearly all of the lands thus "reclaimed" are under water again, the impression remains that an empire of productive land can be reclaimed.

The coastal marshes vary in elevation from Gulf level to about five feet above mean Gulf level. The average elevation is probably 1.5 to 2 feet above the Gulf. The open fresh-water marsh merges gradually into the lower salt marsh. The land generally lies at such low elevation that Gulf tides may be observed far inland. Salt water, during low water stages on Bayou Lafourche, has flowed 70 miles or more inland.¹

Drainage basins in the Delta marshlands are poorly defined and in part overlap. This situation results from the low elevation, the remarkable evenness of the terrain, the numerous inlets and connecting streams, and an abundance of lakes. Streams are usually sluggish. Their direction of flow is governed by one or several of the following: (1) whether precipitation is local or general, (2) direction of wind, and (3) tidal con-

ditions.² In the lower or salt-water marshes the water level in the lakes and channels usually does not fluctuate greatly or suddenly. However, farther inland, particularly in the fresh-water marshes, changes in water level may be considerable and may amount to rises of 3 or 4 feet. Such rises create serious problems for farmers, whose lands usually extend from the high natural levees back to and into the marshlands. Many artificial levees have been built and pumping plants installed to cope with this problem.

Annual precipitation in the marshlands is high compared with most other sections of this country, averaging about 50 to 60 inches per year. This rain falls in an area with little slope and few conspicuous relief features. Run-off is none too rapid and during heavy rains large marsh areas may be covered with shallow water. Torrential rains, which are not uncommon, pose special problems to diked-in reclamations that depend on pumps to keep the ditches clear of water and to maintain appropriate depths to the water table so that crops will thrive. Inadequate pumping facilities were a common grievance on the now largely-defunct reclamation projects.

Aside from torrential rains, especially protracted ones, two other important water problems threaten in the marshlands—river overflow and tidal overflow. As part of the larger alluvial valley of the lower Mississippi River, these lands were subject to frequent overflows by this master stream and its outfall bayous prior to erection of the present high artificial levees. Before the marshlands could be safely developed, protection from overflow was naturally required. The flood-control system of the Mississippi and its tributaries now affords reasonable overflow protection from these streams

¹ Charles W. Okey, *The Wet Lands of Southern Louisiana and Their Drainage*, U.S. Dept. of Agr. Bul. No. 71, April 30, 1914, p. 17.

² *Ibid.*, p. 17.

though in the past crevasses in the levees brought serious damage to many marshland reclamation projects. The huge expenditure of private and government funds to obtain flood protection in lower Louisiana, including protection for the marshlands, is one of the most cogent reasons offered by present-day reclamation enthusiasts for development of these lands, especially government-sponsored development.

While protection from river overflow is believed reasonably certain (though by no means assured), the problem of tidal overflow, so damaging to early reclamation efforts, remains. The daily range of tide along the Louisiana Gulf Coast is small, the average being 0.5 to 1.5 feet. During storms, however, the shallow water bordering the low coast is frequently piled to considerable heights, often reversing the regular flow of the tide. At such times water is swept far inland, damaging reclamation projects where levees are low. Storm tides on Lake Pontchartrain have also proved damaging to reclamations bordering the lake—so damaging that a Gulf sea wall has been proposed by local interests as the only safeguard. The fact that Louisiana's coastal marshes are in the path frequently followed by tropical storms may be a crucial factor in designing future reclamations or in deciding not to attempt them in certain areas.

The soils of the marshland have been the subject of controversy. They are alternately pictured as worthless and as the most valuable agricultural soils in the Nation. The fact that the marshes were for many years almost unexplored except by trappers led to many extravagant beliefs concerning the soils and general

physical characteristics of the area. Common among these beliefs was the one that the marshes were rapidly subsiding; that they were not stable lands but were floating on mud and water and therefore entirely unsafe and impossible of development for agriculture. These beliefs, of course, were exaggerated or untrue. The soils of the coastal marshes, like all the soils of the alluvial valley, have been built layer on layer during periods of overflow of the Mississippi and its distributary streams and by the decay of local vegetable matter.³

Coastal subsidence is now lowering the surface of the deltaic plain. The extent of the area seriously affected has long been a question among reclamation enthusiasts. In 1905, in a letter read at a meeting of the American Society of Civil Engineers, E. L. Corthell presented data tending to show that the marshlands, particularly those at the mouth of the river and along the coast, were subject to a noticeable subsidence, especially since the leveeing of the river had stopped the annual deposits which were raising the level of the lower delta. The apparent lowering of elevation of some old Spanish buildings near the mouth of the river had led him to believe that a subsidence of possibly 1/20 foot per year was taking place. He believed that the subsidence of the marshlands was likely to be a serious problem as their reclamation was carried forward.

The works and observations of many other writers seemed to substantiate this view. United States Army Engineers in their reports of 1899 and 1900 stated that the lands about Port Eads were sinking at the rate of about one foot in 17 years but that the land about New Orleans was

³For an interesting analysis of the various strata of minerals passed through in digging a deep well in the lower delta of the Mississippi, see E. L. Corthell in *The Reclamation of River Deltas and Salt Marshes*, Paper 990, American Society of Civil Engineers, June 1905, pp. 83-84. Compare with A. D. Morehouse, "Reclamation of Southern Louisiana Wet

Prairie Lands," Part I, *Scientific American Supplement No 1843*, April 20, 1911, p. 268. Also see Harold N. Fisk, *Geological Investigation of the Alluvial Valley of the Lower Mississippi River*, Mississippi River Commission, Vicksburg, 1944. This is the most comprehensive study of the physical characteristics of the valley now available.

stationary. In 1914, at the height of marshland reclamation, Charles W. Okey, an engineer with the United States Department of Agriculture, said, "Except in this relatively small area, near the mouth of the river, the remainder of this section of the State shows no change in elevation."⁴ Most of the more modern drainage projects have been established relatively far back from the coast and there is little reason to believe that the changes in elevation which may be taking place have seriously influenced the projects. However, the question of subsidence is of great importance and certainly should be fully investigated before locating new projects. Subsidence is taking place very rapidly in the St. Bernard Delta, for example.

The idea that the Marshlands were not stable land surfaces but floating mats of marsh grass probably arose from the fact that when walking on the marsh soil one could feel a tremble in the heavy organic water-soaked deposits. To describe this characteristic the term "trembling prairies" was coined. It soon became widely used and assumed a noteworthy place in local folklore.

The soils of the marshlands are basically similar to those found throughout the alluvial valley. The lands immediately along the rivers and bayous which lead to the Gulf have been elevated by the action of flooding streams to form the natural levees so typical of the alluvial valley. Along these narrow margins of higher land and coarser soils forest growth has taken hold—the typical hardwoods, such as water oak, ash, and maple, on the higher lands and cypress on the lower. In the marshlands proper no tree vegetation is found with the exception of a few "chenieres" or oak

islands. The absence of vegetation other than marsh grass is largely due to the blackish nature of the water. The fact that the soil is peaty and of course poorly drained also limits the growth of vegetation other than salt grasses.

Most of the soils of the marshland are similar to the Sharkey and Galveston series overlain with various thicknesses of muck. On the higher ridges deposits similar to the Sharkey clay are found and in the marsh proper deposits similar to the Galveston clay are common. The low lying lands are little more than peat bogs to a depth of 3 feet or more. Soil scientists have frequently praised the productivity of the Sharkey soils while pointing out the intractable character of many of the heavier Sharkey clay soils. In 1903, when specialists of the Bureau of Soils of the U.S. Department of Agriculture made a survey of the New Orleans area, they wrote of this series: "The Sharkey clay is a soil of the highest productivity and adapted to purposes of general farming and dairying whenever adequate drainage can be secured."⁵ Of the lower-lying Galveston clay, they had less to say as they saw little chance of its successful drainage.

Since this early work of the Bureau of Soils, considerable areas of marshland have been reclaimed. When the soil is first drained it is soft and springy and pushes before the plow in great lumps rather than turning in a furrow. In the lower areas cultivation of the land has often proved difficult with horses or mules without special equipment. In some places 6 or 8 years have been required to get the muck worked and hardened into a good soil. Several operators on this type of soil reported that only periods of severe drought had dried the peat sufficiently for it to be worked into a compact

⁴ Okey, *op. cit.*, p. 8. The statements concerning subsidence in southern Louisiana published in this bulletin proved reassuring and were quoted in books and papers over the United States.

⁵ U.S. Dept. of Agr., *Field Operations, Bureau of Soils*, 1903, p. 452.

body and mixed with the underlying clay. After several years of cultivation the marsh soils are likely to develop a high acidity due to sulphates which the soils contain. This is particularly true of those areas near the Gulf, and in areas where little silt is intermixed with the muck. In many instances these acid-forming materials have proved so abundant that extreme and expensive measures are required to control them and render the soil suitable for crops. Many reclamation projects failed because of this soil condition; those nearer the Gulf, where the sulphates left by the sea water are more concentrated, naturally suffered more severely.⁶

Under cultivation, the peat soils shrink and settle to a considerable degree. Some fields after 10 years of cultivation have settled 3 to 4 feet. The sunken fields of abandoned reclamation projects stand out as large square or rectangular ponds on the topographic quadrangle sheets for southern Louisiana.⁷ This shrinking of soils, further reducing the elevation of already low areas, makes it necessary to have expensive levees around reclaimed land to protect it from stream overflow and tidal waters. It also means that a reworking of the interior drains is necessary as the lands settle. An indirect but important element of this soil shrinkage is that it subjects the drained district to severe frost hazards as the cold air flows into the low-lying fields of the reclamation project. This flow of cold air has prevented the production of certain early vegetables on reclaimed land of southern Louisiana at a season when they could be marketed to advantage.

The peat soils of the Louisiana marshes have many other characteristics common to organic soils. For example, they frequently take fire and burn. Considerable

areas of reclaimed land have been damaged in this manner. So likely is burning to take place that weeds cannot be burned from the newly reclaimed land except when it is thoroughly wet.

Reclamation Proposals and Activities Before 1900

Since some of the more ambitious marshland reclamations took form during the first decade of this century, it is sometimes asserted that this work is largely if not exclusively a 20th century effort. As significant as is the work done in the last 40 years, particularly that done between 1907 and 1915 by enterprising immigrant capitalists from the Northern states, marshland reclamation in southern Louisiana is a very old idea and considerable experience had been gained in this specialized work before 1900 and even before the Civil War. In fact, the enthusiasm for this work that developed during the first decade of the 20th century came as a climax to a century of reflection, writing, and experimentation in Louisiana, though at the time of the greatest enthusiasm (1907-15) the developments were commonly thought to be original and revolutionary.

Pre-Civil War Period. The French settlements along the embankments of the lower Mississippi River from the very beginning were rather remarkable reclamation achievements. These settlements followed the relatively narrow, serpentine natural levees that flanked the master stream and several of its outfall bayous. In front of these settlements flowed the erratic streams which for ages past overtopped and crevassed their banks during flood stages and so relieved themselves of an overburden of flood waters, which in turn built up the only prominent land feature in the area, the natural levees.

⁷ For excellent examples of the flooded, sunken fields of reclamation projects see the Cut-Off and Allemands quadrangles of the United States Geological Survey for Louisiana.

⁶ See map, No. 13.

Thus the settlers were challenged from the very first to institute various forms of land reclamation, particularly flood control and drainage. For this reason the earliest records of the French settlements in Louisiana, many of them now preserved in the National Archives of France, are in a very practical sense records of a great land reclamation project.⁸

Early land reclamation in Louisiana was of necessity confined mainly to flood control and protection of the expanding settlements on the relatively high natural levees. Although there was much speculation regarding the development of lower swamp and marsh lands, it was realized that the better and higher lands first needed to be made secure against the ravages of floods in the major streams. The attainment of this protection was delayed long beyond early expectations, largely because of the meager resources of the local settlements in the Delta area. Only after flood control became a major federal preoccupation in recent decades were the prospects of minimizing flood dangers realized.

Although engineering skill was mostly preoccupied with flood control until relatively recently, some interesting and significant suggestions were made regarding the reclamations of swamp- and marshlands in Louisiana as long as a century ago. One of the most interesting reports of this kind was prepared by Lewis De Russey and was presented in *A Special Report Relative to the Cost of Draining the Swamp Lands Bordering Lake Pontchartrain* (Board of State Engineers,

Baton Rouge, February 1858). This imaginative engineer was employed by the state to prepare a plan whereby these lowlands might be drained. The legislature clearly wanted a plan that would be immediately productive, which required the establishment of pumping plants and the building of levees to keep the water out of the project area. Knowing the great cost of pumps and the frequency with which pumping projects had met financial failure, De Russey ventured to present two plans to the legislature—a conventional design for levees and pumping plants and an alternative, long-range plan involving a series of settling basins, or, in the language of the designer, “a system of colnates,” for collecting river silt and thereby gradually raising the land level by siltation, thus attaining a permanent reclamation.

The feasibility of this plan is suggested by De Russey since the following three requirements are present: First, there must be current water charged with alluvium, susceptible of being directed upon the land to be improved. Second, the land must be of lower level than the passing waters. Third, there must be a declivity from the surface of the flooded land by which to drain off the water when it has deposited its sediment by repose. The long-term nature of this plan apparently made it unattractive to the legislature and so the more traditional approach, involving dikes and pumping plants, was given more serious consideration. The Civil War, however, prevented the carrying out of these plans.⁹

⁸ The archives of the Departement De la Marine et des Colonies, at Paris, contain eight large folio volumes relating to the French possessions in Louisiana. In 1841, E. J. Farstall, of New Orleans, visited Paris and made a synopsis of the main matters discussed in these volumes. Some of his findings were conveyed to the Governor of Louisiana, A. B. Roman, and later published in *De Bow's Review* of March 1846. This correspondence reveals the great interest of the French governors and land settlers in matters of land development.

⁹ De Russey's plans regarding siltation place him in the

company of many present students of the Mississippi alluvial valley. Numerous soil specialists, conservationists, geographers, physiographers, and others are distressed by the extravagant waste of dumping into the Gulf the great soil load gathered by the Mississippi River from its huge drainage basin. This dumping results from the high artificial levees which channel the flood waters of this stream directly into the Gulf whereas formerly the flooded lowlands were heavily silted by these flood waters. To save this productive alluvial material and to build up much of the valley now poorly

(Footnote 9 continued on page 304)

During the decade before the Civil War, flood control on the Mississippi had apparently reached a degree of safety sufficient to encourage attempts to reclaim the marshlands. Some optimistic planters pushed their clearings into the swamps and marshlands. The city of New Orleans extended the area under pump and laid elaborate plans for enlarging potential residential areas. Contractors and engineers did a thriving business and De Bow saw a great future for the undeveloped wilds at the doorstep of New Orleans.

As early as 1846 swamp and marsh areas in Orleans Parish were diked and the drainage water was pumped out. The yield of Sea Island cotton planted on these reclaimed lands was said to be "un-qualified, and the staple unsurpassed." Other parishes had similar marsh and swamp reclamation projects, but the Civil War shattered the plans of land developers. Projects were completely abandoned. Main-stream levees began to deteriorate and in places were washed away entirely or destroyed by military means. For a number of years reclamation was at a standstill.

Civil War to 1900. During the period of Reconstruction little work was done in reclaiming the swamps and marshes. Levees had to be repaired before any thought could be given to reclaiming lowlands, and the rebuilding of levees took many years.

In the 1870's and 1880's interest in land reclamation began to be revived and some marshland drainage programs were started in southern Louisiana. Throughout the United States this was a period of experimentation in developing new

lands. Irrigation works were being expanded in the arid regions; and the way was paved for the large-scale government participation in irrigation reclamation that came soon after 1900. In the East and South, swamp- and marshland drainage projects were being started in nearly every state. Improved machinery, frequently powered by steam, was becoming available for the heavy work of leveeing and ditching. Many ideas were imported from England, Germany, and Holland where reclamations of swamp and marsh were being carried out on a large scale. The reclamation work in the Zuider Zee was particularly well known in America.

The U. S. Department of Agriculture lent its support to these efforts at land reclamation. In 1885 a study by D. M. Nesbit entitled *Tide Marshes of the United States* was published as its Miscellaneous Special Report No. 7. Other more specialized reports followed. Most of them stressed, as did Nesbit's report, "that the day of unlimited cheap land is passing." Increasing land values were thought indicative of a land shortage. Land reclamation was hailed as a noble contribution to the greatness of the Nation. Some of the government reports were popular bulletins designed to show that reclamation could be done—and done profitably. Optimists were plentiful, though the failure of reclamation projects was not uncommon.

While land reclamation projects in Louisiana during this period were not so numerous or spectacular as those attempted along the Atlantic Coast, considerable capital was invested in experiments for reclaiming swamps and marshlands.¹⁰ In 1878 the Louisiana legislature chartered the Louisiana Land Reclamation Company, a private corporation,

(Footnote 9 continued from page 303)
drained, a program of controlled siltation is receiving increased attention. See W. W. Atwood, *Saving the Silts of the Mississippi River*, Bulletin of the Geological Society of America, Vol. 28 (1916). See also his *Physiographic Provinces of North America* (1940), pp. 40-41.

¹⁰ D. M. Nesbit, *Tide Marshes of the United States*, U.S. Dept. of Agr., Miscellaneous Special Report No. 7, Washington, D. C., 1885, p. 181.

which reclaimed some 13,000 acres in the coastal area of Terrebonne Parish. This land was developed through the use of a comprehensive system of canals and levees. Steam dredges were used. Later land was broken by cable plows powered by the engines of two steam dredging machines which floated in canals at opposite sides of the fields. The company grew rice, jute, and various vegetable crops. Rice production was very successful, the yields being greater than those reported in the South Carolina area. Nesbit reports that the jute grew 6 feet in 5 weeks on the reclaimed land.

Very little is known of the later history of this project and of the activities of the company. Shortly after the project was started, some of the principal shareholders died and the company became involved in financial difficulties. The project was abandoned, after being flooded by waters from the Mississippi River pouring through a crevasse in Pointe Coupee Parish. In 1883 a tract of 1,360 acres was developed in the area but this project was destroyed by the great flood of 1884 which swept the levees away.

In St. Mary Parish a substantial number of planters attempted to reclaim land by means of the Elba drainage wheel or similar devices, which discharged drainage water over back levees. True marshland reclamations were rare. The danger of flood prevented capitalists from undertaking such projects. "The flood wave of 1883, from the Mississippi River, rising $11\frac{1}{2}$ feet above the level of the lowest cultivated land on the east bank of Bayou Teche, poured into this bayou and over its high west bank, through much of its extent, covering cultivated lands as much as 9 feet in the lowest portions."¹¹

Toward the close of the 19th century

some of the southern railroads joined a swelling chorus of Dixie land promoters. Scores of booklets issued from their land departments. Settlement opportunities were presented as widespread, not only in Louisiana but in every southern state. Among the railroads that gave much space in their promotional literature to Louisiana lands were the Southern Pacific, the Missouri Pacific, the Illinois Central, and the Louisville and Nashville. They advertised not only railroad lands, but also gave publicity to privately-held lands and to developments that would reclaim new land. An example of such a pamphlet is *The Reclamation of the Marshland on the Louisville and Nashville Rail Road* issued in 1886. This bulletin described the plans of the American Land Company for the development of a large tract of marshland about 50 miles square and only 20 miles from New Orleans, bordering Lake Pontchartrain. It was declared that these lands were "absolutely free from all danger of fresh water or river overflow." Other advantages of this tract were described in part as follows:

... a large, conveniently shaped body of land containing . . . over 26,000 acres, capable of convenient sub-division into from 250 to 500 productive farms, . . . ; only 25 miles from the City of New Orleans; surrounded by immense bodies of salt water which contain the finest fishing and oyster grounds in the world; perfectly healthy; fanned by sea breezes; a climate in which the thermometer rarely reaches the freezing point, and in which a rotation of paying crops can be grown, and cattle pastured on green grass all the year round; traversed through its center by a great railway leading directly to all the best markets of the country, with inexhaustible springs of pure water . . . ; a soil which challenges the world for richness and fertility, . . . this princely estate . . . can be safely and permanently reclaimed and drained ready for cultivation by the expenditure of less than \$251,000 an average of \$9.65 per acre, which covers the entire cost of an extra

¹¹ Statement of W. J. Thompson, quoted in *ibid.*, p. 14.

powerful embankment . . . [and] all necessary drainage machinery.

As an engineering task, the work is simple—there are no doubtful points—there will be no “unexpected difficulties.”¹²

These great plans did not materialize, but this statement of the supposed possibilities to be gained from marshland reclamation loreshadows those issued in large numbers shortly after the turn of the century.

In the coastal prairies of southwestern Louisiana some experiments in reclaiming the tidelands were made. Automatic floodgates, wind pumps, and other devices were used. For a time success seemed assured but Gulf storms soon washed high waves into the leveed projects and they were abandoned.

During the period from the Civil War to 1900 many of the attempts at reclamation were tideland projects.¹³ Their proximity to the coast made them very vulnerable to storms. The wave of reclamation that came after 1900 centered farther inland on marshes not quite so vulnerable to Gulf winds and high tides.

Reclamation Proposals and Activities After 1900

The turn of the century marked an important milestone in our agricultural history. Most of the better lands in our agricultural frontier had passed into private hands and it appeared that an era of homesteading and cheap lands had come to an end. No extensive wheat belt had been pushed into the short grass lands. For the most part our agricultural empire seemed to have pretty well reached its limits. The Reclamation Act of 1902, however, gave prospect of developing some arid lands in the West, and in the more humid East much discussion took place regarding the development of swamp- and marshlands.

In fact, simultaneously with the development of federal reclamation projects in the arid west, an extensive program of draining wet lands, marshlands, and swamplands was carried out in the East under private auspices. From 1900 to about 1930 an immense drainage program was carried out not only in the alluvial valley of the Mississippi River, but also in the poorly drained glaciated lands bordering the Great Lakes. Throughout the alluvial valley, hundreds of drainage districts were organized under newly enacted state laws. These districts issued bonds, levied taxes, and contracted for the building of drainage systems. Some of the drainage plans, like those of the Little River Drainage District in Missouri and the Cypress Creek Drainage District in southeastern Arkansas, were elaborate and costly; but most of the undertakings were relatively small, both in engineering and in financing. Outside the marshland areas, the great majority of these drainage districts were based upon gravity flow of drainage waters.

The social and economic conditions that led to the vast reclamation program begun about 1900 in the alluvial valley of the Mississippi are too complex to be analyzed here. A suitable physical setting was provided by the fact that the forests of the area were being rapidly cut over and many of the lumber companies were moving to other localities and by the fact that the expanded federal flood-control program on the Mississippi River seemed to offer a degree of protection greater than ever before. The rising land values and general prosperity prevailing at the opening of the century also favored expansion of the land base.

While the marshland pump reclamation projects were organized simultane-

¹² Cf., Thomas H. Means, *Reclamation of Salt Marsh Lands*, Circular No. 8 (rev. ed., Oct. 1903), Bureau of Soils, U. S. Dept. of Agr.

¹³ Pp. 9, 10, 11.

ously with the more common gravity drainage projects of the areas with higher elevation, they constituted a distinct aspect of the general drainage movement. For the most part the marshlands were reclaimed by individuals and companies that desired to sell immediately the reclaimed land to agricultural settlers, particularly to immigrants from the Lake States and the Corn Belt, and even from Europe. Most of the gravity drainage districts, on the other hand, were developed by farmers who wished to improve their own holdings. This was particularly true in Louisiana.

New attempts at swamp- and marshlands reclamation in Louisiana around 1900 were started in a quiet and more or less experimental way by capitalist land promoters. By 1908 or 1909 these developers were ready to launch their plans on a major scale. Companies for land development and settlement promotion were organized rapidly. By 1915 some major reclamations had been attempted, and colonies of immigrants had settled on the marshes where about 125,000 acres of land were under pump.¹⁴ Before the development had run its course, early in the 1920's, it is estimated that some 240,000 acres had been brought under pump drainage.¹⁵ Figure 1 shows the location of the principal projects started in the marshlands.

Development and Settlement of Projects. Much of the reclamation was initiated and further promoted by Northern men. One of these was Edward Wisner, a Michigan man who came to Louisiana shortly after 1900 to rest from an illness. He became interested in the marshlands and believed they could be developed by appropriate engineering plans. The Louisiana Meadows Company became his main vehicle for this undertaking, al-

though subsidiary companies were also formed. A. T. Dusenbury and A. G. Groves were closely associated with Wisner in developing a complex business organization that carried forward marshland development projects. Wisner, however, held a premier position in this trinity. It was he who first began to buy marshlands and swamplands in large blocks at levee board sales, paying 12½ cents an acre for much of it. At one time he is said to have held nearly 1,500,000 acres of this type of land.

The first of the Wisner reclamation projects was at Labranch on the Illinois Central Railroad about 15 miles northwest of New Orleans. The cypress swamp was cleared and leveed, and a pumping plant was installed. Corn and various vegetable crops were grown and the project attracted the attention of other reclamation interests. Its good location and the excellent yields of crops, largely corn, soon convinced many prospective investors that lands of this type were valuable. Bids of \$200 to \$300 an acre became common.

The Louisiana Meadows Company grew rapidly and subsidiary companies were formed. The Suburban Realty Company, Ltd., was organized to handle the developments in St. Charles Parish around Labranch. The Truck Farm Land Company, Ltd., developed the Wisner holdings near Paradis. The Terrebonne Land Company, Ltd., worked in the Raceland area. The Louisiana Meadows Company supplied the general promotion and sales services for the affiliated companies.

The land companies mentioned were interested in developing large tracts of marshland and subdividing them for sale

¹⁴ Charles W. Okey, "Run-off from the Drained Prairie Lands of Southern Louisiana," *Journal of Agricultural Research*, Vol. XI, No. 6 (1917), p. 247.

¹⁵ It is difficult to estimate the acreage under pump at any one time on account of the failure of some projects and the introduction of new ventures. See S. M. Woodward, *Land Drainage by Means of Pumps*, U. S. Dept. of Agr. Bull. No. 304, p. 6.

as small farms. They were also interested in getting other capitalists to invest in the marshlands they held. Toward this end, they opened publicity offices in Chicago and other northern cities. In the New Orleans offices a staff including engineers and draftsmen was installed to work out plans not only for the development of the land but for planning the houses and villages that would be built on the reclaimed land. The efforts of these men and the capitalists they attracted to the area started the marshland drainage movement in southern Louisiana. The railroads, the colleges of agriculture, the state government and the United States Department of Agriculture helped directly or indirectly to aid the projects which were started.

The railroads were again active in promotion of the marshland projects, the Illinois Central and the Louisville and Nashville particularly. They offered special low fares on certain days to home-seekers and issued much promotional literature telling of the "wonderful possibilities and opportunities" which the marshland held.¹⁶ Parties of prospective purchasers were brought to Louisiana by the railroads. Tours of the various reclamation projects were made and the soils and crops were inspected. Orders were taken for lots and farms from 50 to 500 acres. On some projects homes were constructed and citrus trees were planted by the land companies. Prices ranged from \$150 to \$650 per acre, according to location and degree of development.

The Louisiana State Department of Agriculture and Immigration, long active in land promotions, took an active interest in promoting marshland develop-

ment and sale. H. D. Wilson, Commissioner of Agriculture, took parties of business men, newspaper editors, and prospective settlers to see the reclaimed lands. The state circulated thousands of copies of leaflets describing the "wonderful" climate of southern Louisiana and the fertility of the marshland soils. One of the most interesting of such leaflets widely circulated by the state is entitled *Down to Brass Tacks* (not dated but probably released in 1910; available in Tulane University Library). In part, this leaflet says: "If the Federal Government will get back of the project to reclaim the overflowed district of South Louisiana, that section could be made to rival Illinois and Iowa as a corn-producing section."¹⁷

As new projects were developed, advertising and other promotional activities to attract settlers became more intense. Religious groups were invited to form colonies to take over whole projects and some Amish farmers did settle, for a time, on one of the reclamations. Boxes filled with peat soil were shipped to many parts of the country to show prospective settlers the character of the land. Bulletins of the U. S. Department of Agriculture were searched for passages that could be quoted to advantage. A good many suitable statements were found. Often old bulletins were used. One widely circulated pamphlet quoted a U. S. Department of Agriculture bulletin to the effect that the South was the best of the corn-producing regions, a yield of 237 bushels per acre having been obtained in South Carolina.¹⁸ The bulletins by Charles W. Okey and J. O.

mingo County Mississippi; Tangipahoa Parish, Louisiana; and Madison County, Mississippi.

¹⁷ The Bureau of Reclamation of the Department of the Interior (established in 1902) was the most frequently mentioned government agency thought capable of handling the job.

¹⁸ The bulletin used was *Corn Culture in the South*, by S. M. Tracy, U. S. Dept. of Agr. Bull. No. 81 (1898).

¹⁶ See: J. F. Merry, *Louisiana Reclaimed Lands Make Fertile Farms* (Information Concerning the Prairies, Marshes, and Cypress Swamps of Louisiana and How They Are Being Reclaimed), issued by Passenger Dept., Illinois Central Railroad Company, Manchester, Iowa, 1919. Some of the more popular land settlement bulletins issued by the Illinois Central Railroad are: *The Yazoo-Mississippi Valley*; *Tish-*

Wright were widely quoted and in such a way as to make it seem that the U. S. Department of Agriculture endorsed the exaggerated statements contained in the promotional literature.¹⁹

As mentioned above, much of the settlement literature was designed to attract farmers from the Lake States and the Corn Belt. The fact that corn was the principal crop grown on many of the reclaimed lands appealed to grain and livestock farmers. Other crops, such as alfalfa and the clovers, were frequently mentioned in the literature and the projects were pictured as suitable for general farming. Those located near New Orleans were sold as truck or citrus farms. Since many Northern farmers held various notions concerning the hot summers and generally unhealthy conditions of the South, much of the literature was designed to banish these ideas. Some typical paragraphs from the literature of the Louisiana Meadows Company follow:

"This part of the State [the New Orleans area] has a seashore climate and pleasanter by far than the Eastern seashore for here all the breezes and winds in summer are from the salt Gulf.

The health of the people of the South is markedly better than that enjoyed by people in the North. The coastal plain of the Gulf of Mexico is much more healthful than the region of the Great Lakes because of the salt air of the Gulf and mild and regular climate which permits out-of-doors living in winter. This is why there is so little catarrh and pneumonia and why chills and fever are almost unknown and why malaria is reasonably rare.

If you have a family of small children, this is the climate in which you should raise them. . . . Notice in the newspapers we send you the light mortality of children in Louisiana.

¹⁹ While the publications of the U. S. Dept. of Agr. and of the state experiment stations were frequently misused by land promoters, it is only fair to acknowledge that some of the publications of the federal government and the state had been over-enthusiastic concerning the ease with which the marshes of Louisiana and other states could be reclaimed. It is also true that the official literature sometimes reflected a lack of exact knowledge as to the general need for new land, and in general failed to report upon the more undesirable features of the reclamation promotions.

Is it not better to live where the land does the work, or most of it and does it twelve months a year instead of four or five?

Investigate these statements in person—we guarantee their truthfulness.

Notice the Government map we print in this booklet. Does it not show why our lands are the richest in the United States? Now if we are telling the truth about the healthfulness of this locality, is this not the place to live and farm?" [The map referred to was simply a sketch map of the Mississippi Valley showing the drainage basin which composes it.]²⁰

As the boom in marshland reclamation caught on, the swamps of southern Louisiana were alternately pictured as a second Corn Belt, as a first-rate truck gardening area, as a new citrus belt, and as a Rice Bowl. For a time the Raceland prairies were heralded as a new celery-producing area. Soil scientists testified to the great productivity of the muck deposits and the wide variety of uses to which they could be put. S. H. Hoover, Head of the Agricultural Department of the State Normal School at Warrensburg, Missouri, became an enthusiastic supporter. He went to Holland and returned with the belief that what had been done there could be done in Louisiana. John H. Kruse, a well-known engineer and geologist, made a study of the marshlands and predicted that they would become the site of the world's finest citrus groves. He felt that within 10 years (he wrote about 1908 or 1909) they would be selling for \$1,000 to \$2,500 per acre, depending on their location.²¹

Settlers came from all over the United States to buy marshlands. Before the movement had run its course, 12 to 15

²⁰ The above paragraphs are from a booklet entitled: *Small Farms of Reclaimed Alluvial Louisiana Land, Vicinity of New Orleans*, Louisiana Meadows Company (not dated, probably published about 1909 or 1910). As usual in such literature, many pictures of bulb fields in Holland are used as illustrations.

²¹ *Reclamation of Alluvial Lands in Southern Louisiana*, copyrighted by G.H. McWilliams, Chicago, 1909. Distributed with the compliments of the Louisiana Meadows Company. (Tulane University Library.)

thousand persons had visited the projects and 4 to 5 thousand had made investments, some as speculators, some as actual settlers. A pamphlet of the time was enthusiastic:

"During the past few years the tide of immigration has been turned toward the South. It is estimated that during 1908, 250,000 people from the North, East and West settled in the State of Texas. The whole South is feeling the benefit of this immigration. Louisiana will receive its part. Already the development of the rice industry at Jennings and Crowley has converted a barren waste into populous and thrifty communities and it is estimated a quarter of a billion dollars has been added to the value of the land which only a decade ago was considered worthless. The area of wet prairie delta land in Southern Louisiana that will eventually be reclaimed covers approximately 3,000,000 acres. Of this area nearly 500,000 acres located conveniently near New Orleans, and possessed of excellent transportation facilities, are ripe for reclamation at present [1909]. This whole area has an average present value of \$5 per acre, or a total of \$15,000,000. The cost of reclamation (including the lowest coast lands) will average nearly \$20 per acre or \$60,000,000. The land reclaimed will readily bring an average of \$100 per acre, or a total of \$300,000,000, yielding a profit of \$225,000,000 over the cost of reclamation."²²

Thus went the reasoning of the land developers. They were widely praised for their foresight and enterprise:

"No more noble undertaking than that of marshland reclamation could be imagined . . . , and the greatest credit is due to those who first exploited the idea of reclaiming the swamps. If monuments were erected to them in every town in the State, Louisiana would still owe them a debt; but they are modest people and are content to see, as monuments to their initiative and engineering skill, waving fields of crops, hundreds of carloads of

agricultural products going to market, prosperous homes and farmers with swelling bank accounts, where formerly watery desert reigned supreme."²³

Physical Characteristics of Projects. The plan developed by the Wisner companies for reclaiming swamp and marsh land was not basically different from plans tried in former years. The lands to be reclaimed were leveed, internal drains were constructed, and a pumping plant was installed at the lowest point on the project to discharge the drainage water over the project levee into adjacent canals or bayous where it found its way to the Gulf. The details of many of the projects are preserved in technical bulletins of the U. S. Department of Agriculture and in the files of various engineering societies.²⁴

Although there were substantial differences in various project designs, basic arrangements were remarkably similar. The levees varied in height from 2 to 8 feet according to the location of the project and the expected height of the occasional storm tide. Construction was done largely with steam-powered machinery, some of it designed especially for work in the marshlands. Material excavated from canals was used in constructing the levees. The care exercised in building canals often determined the success of the project. Frequently the base of the levee was not carefully prepared; as a result seepage was appreciable and required excessive running of the pumping plants. The softness of the marsh required that the levees be added to as they settled. On some projects the levees were still settling badly after being repaired and built up to the desired height for 8 consecutive years. Since

(Sept. 1917), p. 603; A. D. Morehouse, "Reclamation of Southern Louisiana Wet Prairie Lands," Parts I and II, *Scientific American*, Supplement Nos. 1843-44, April 1911, pp. 268-70, May 1911, pp. 276-78; "Drainage Extends Suburban Area of New Orleans," *Engineering News Record*, Vol. 99, No. 13 (Sept. 1927), pp. 515-17.

²² *Ibid.*

²³ From the *New Orleans Item* of August 31, 1907.

²⁴ See Charles W. Okey, *Wet Lands of Southern Louisiana and Their Drainage*, U. S. Dept. of Agr., Tech. Bull. No. 652, June 1918, and Tech Bull. No. 71, April 30, 1914; A. M. Shaw, "Louisiana Reclamation Project Grows to Seven Thousand Acres," *Engineering News Record*, Vol. 79, No. 13

water stands against the outside of the levees for a large part of the year, crayfish and muskrats burrowing in them cause much damage.

Canals and laterals, like levees, are expensive to keep up. They usually require redredging 2 to 4 years after they are first cut. In the lower, softer parts of the marsh there is a tendency for fine mud and silt to seep into the canals as the water is lowered, resulting in the need for redredging. Clearing the ditches of the soft mud is a difficult and expensive operation. On many of the projects the ditches were not built properly. On some they were much too far apart; on others they were too deep, or not deep enough.²⁵

The pumping plants were the focal points of the projects. On some of the larger projects rather elaborate plants were installed. Centrifugal or screw pumps were used. On some projects a series of pumps were required; on others one pump was thought sufficient. In general, the pumping plants were designed to remove 1 to 1.5 inches of water in 24 hours. Too often this was the maximum theoretical capacity of the plants and not the actual performance. A number of projects were equipped with plants with a capacity of only 0.50 inch per 24-hour period. These plants proved grossly inadequate. In southern Louisiana a 3- to 4-inch rainfall in 24 hours is not unusual, and considerably heavier rainfalls have been recorded. Accordingly, the few projects that stayed in operation found it necessary to add further pumping units.

Inadequacy of Drainage District Laws. Almost all marshland reclamation projects in Louisiana were organized as drainage districts under state statutes. Once

so organized, its elected drainage commissioners were empowered to issue bonds for constructing drains and building levees. Acreage land taxes up to \$3.50 per acre per year could be assessed.²⁶

In the literature distributed to prospective settlers very little mention was made of the organization and management of the drainage districts that developed the lands they were buying. Once the lands were sold, the responsibility for management of the system, including the elaborate pumping plants, fell on the commissioners elected by the newly settled small farmers. Many of these men did not comprehend the magnitude of the engineering task involved in keeping the levees, drains, and pumps in working order. A struggle frequently began between the bondholders (the former developers) and the settlers to gain control of the project. Naturally the bondholders wanted the project to be kept in good order lest the reclamation fail and the bonds be defaulted. Many of the settlers felt that the bondholders were forcing higher taxes than were needed. Controversies were prolonged and seldom were satisfactory agreements reached.

In 1906 the state legislature provided that the Board of State Engineers should make a survey of proposed projects to determine the feasibility of the reclamation. In 1910 (Act No. 317) the legislature strengthened this aspect of drainage legislation and separated legislation dealing with gravity drainage from that dealing with pump drainage. In pump districts new emphasis was placed on the duty of the Board of State Engineers to make surveys and estimates of costs and to locate pumping plants.

²⁵ Cf. A. M. Shaw, "Land Drainage in Louisiana," *Engineering News Record*, Vol. 70, No. 7, pp. 300-303.

²⁶ In 1921 the drainage law governing pump districts was modified to make possible tax levies based on assessment

of benefits. Under this law the tax could exceed \$3.50 per acre and often did. However, most of the pump districts were organized under earlier laws.

Reclamation interests believed that these laws strengthened the position of reclamation bonds and considerable publicity was given the part that the Board of State Engineers was to play in making marsh reclamations sound developments, both in engineering and in financial aspects.²⁷ Bulletins were written purporting to show the gilt-edge character of drainage bonds. Robert A. Milling, a prominent New Orleans attorney, said in an address before the National Drainage Congress assembled in New Orleans in 1912, "I predict in 10 years that you will find no bond upon the market that will find a more ready sale than Louisiana reclamation bonds."²⁸

While sales agents for marshland companies and jobbers of reclamation bonds laid stress on the part the Board of State Engineers played in making and approving the reclamation plans, in actual practice the State Engineers exerted little influence on the developments. In many instances they approved plans without visiting the project, and in no sense did they exert any judgment as to the desirability or feasibility of the reclamation. The Board of State Engineers was so understaffed that it simply could not carry out the law. The Biennial Report of the Board for 1912 and 1914 comments on this lack of adequate check on reclamation projects: "In fact, the Board cannot really be said to have met the situation with anything like general satisfaction, because of the constant strain upon its forces and time by other imperative duties." Outside engineers were appointed to make whatever casual inspections were made. In the Biennial

Report for 1916-18 the State Engineer said:

"The Board of State Engineers, as a matter of fact, learns little or nothing about the practical success of the projects for drainage and reclamation presented to it for examination and approval. A project once leaving the Department, with the seal of approval, is lost sight of. In fact, no official evidence of the progress or completion of the project either in accordance with the plans and specifications, approved or otherwise, is ever filed."²⁹

Under these conditions, drainage promoters were left free to promote almost any kind of project they desired. The failure of many projects was certainly in a large part due to poor and inadequate plans. While many saw this weakness in the legislation it was not till 1921 that more exacting legislation was passed governing the creation and management of reclamation projects. The state constitution of 1921 made special provision for the laws governing pump reclamation and a special session of the legislature of that year enacted a "Leveed and Pumped Drainage District Law," providing for a "Plan for Reclamation" and an assessment of benefits, with court approval for both.³⁰ This act was of course too late to influence the wave of reclamations just described. It will be of great importance in directing future works in the marshes.

Present Status of Selected Pump Reclamation Projects. None of the pump reclamation projects established in the Mississippi delta of southern Louisiana have been entirely successful; most have been complete failures. Several reclamations near New Orleans have survived, but as residential and industrial sites rather

²⁷ For example, see news item in *Outlook Magazine*, Vol 104 (July 26, 1913), p. 645.

²⁸ See, "A Reprint of the Drainage Laws of Louisiana, with a Decision of the Supreme Court of the State of Louisiana Upholding their Legality and Constitutionality and a Discussion by Robert A. Milling," New Orleans: The Meadows Company, 1912.

²⁹ *Biennial Report of Board of State Engineers, 1916-1918*, p. 79.

³⁰ Act No. 85. See also the following amendments. Acts of 1924, No. 235; Acts of 1926, No. 272; Acts of 1928, No. 200; Acts of 1940, No. 228. Also see: Kenneth Wernimont, *Digest of Louisiana's Drainage Laws*, Bureau of Agricultural Economics, Baton Rouge, La., 1941.

than as agricultural projects. Several of the rural projects at first dependent entirely upon an agricultural base have been sustained in recent years by the sale of oil from the valuable deposits that underlie them. Non-agricultural conditions have had much to do with keeping in operation the few remaining pump reclamation projects, though some minor successes with crop production on reclaimed marshland have been reported.

Several score of pump reclamation projects were developed in the delta area. Most of them were promoted for the purpose of developing small farms. For all projects, development costs were excessive, taxes were high, farming for the most part failed, financial losses were heavy, and with a few exceptions the projects are again under water. Some of the "drowned" projects have been taken over by duck shooting clubs. The problems encountered and the end results of the projects are similar. Detailed records on all the projects, and particularly identical records for comparison, are difficult if not impossible to obtain. Bookkeeping and record-keeping is not one of the well-cultivated arts of most promotional organizations, and rather careful field investigations suggest that for many of the projects no detailed accounts of activities and methods of operation exist. For these reasons only some of the better known projects are listed below, together with some pertinent facts. (Project numbers in parentheses locate the projects on the map. Note that map used here was prepared in 1917):

(1) New Orleans Lake Shore Land Company (No. 36); 7,000 acres. Failed as agricultural undertaking; subsequently much land bought by speculators interested in holding it for industrial or residential sites.

(2) Plaquemines-Jefferson Drainage District (No. 37); 37,500 acres. Less than 8,000 acres farmed at present, much idle and

waste land. Pumping facilities inadequate.

(3) Jefferson Drainage District No. 4 and related subdistricts (No. 45). Largely industrial and residential.

(4) St. Charles Municipal Drainage District No. 1 (No. 17), also known as Sunset Drainage District; about 10,000 acres. (Several projects started in this area in early 1900's; only one remains.) Flood overflowed district in 1912. Drainage local and inadequate. Only 25 to 30 percent of land in agriculture, used mainly for pasture and forage crops. Land now owned by corporation and rich oil deposits being developed. Once settled by Corn Belt farmers; all of them now displaced. (See Allemands Quadrangle, U. S. Geological Survey.)

(5) St. Charles Drainage District No. 1 (No. 18); 2,800 acres. Drowned fields now used by duck hunting club.

(6) Lafourche Drainage District No. 6 (No. 19); 1,800 acres. Drowned fields now used by duck hunting club. (See Allemands Quadrangle, U. S. Geological Survey.)

(7) Lafourche Drainage District No. 12; 8,265 acres, composed of subdistricts listed below. Part of project is above local water level and has loamy soil favorable for corn. Lower areas never suitable for small farmers. Corn Belt farmers failed. No intensive use of land developed and corn remains principal crop, although some grass seeds have been produced. (See Houma Quadrangle, U. S. Geological Survey.)

(8) Subdistricts 1, 2, 3 of Lafourche Drainage District No. 12 (Nos. 10, 11, 12); 835, 940, and 2,250 acres respectively. Small farms at first sold to Corn Belt farmers, who failed. Small farmers in area took over but have not made success of farming. No high-value crops produced and high drainage taxes met with difficulty. Now extensive repairs and renovations necessary and no money for this work is in sight.

(9) Subdistrict 4 of Lafourche Drainage District No. 12 (No. 9); 4,240 acres. Became the property of engineering company which developed Nos. 7 and 8 above. Operated as private holding along plantation lines, specializing in beef cattle. Serves as a kind of luxury farm on which expenses have been heavy, profits from agriculture rare, and subsidies have been common. Oil now helps sustain operations.

(10) Smithport Plantation (No. 14); 847 acres. Original drainage reservoir capacity inadequate and so was enlarged. For a time land was well drained, although tropical storms did serious damage and hindered pumping operations. Serious condition of soil acidity developed after several years of farming. Project now abandoned. (See Houma Quadrangle, U. S. Geological Survey.)

(11) Lafourche Drainage District No. 13, Subdistrict No. 1 (No. 15); 2,000 acres. Development cost underestimated and project abandoned after spending funds from \$60,000 bond issue. (See Houma Quadrangle, U. S. Geological Survey.)

(12) Delta Farms (4 units); (Nos. 23, 24, 25, 26) areas range from 600 to 3,000 acres. Three smallest units abandoned, one of them now serving duck hunting club. Large unit of 3,000 acres survived with heavy losses and subsidies. Changed ownership several times and is now owned by corporation. Owners interested in oil prospects. Operated as stock farm; corn main cultivated crop. Levees and drains in deteriorated state. One of two major pump projects that survives.

(13) Clovelly Farms, Subdistrict No. 1 of Lafourche Drainage District No. 20; (No. 46) 2,500 acres. Private reclamation developed by Northern man as demonstration project. At first operated under tenant system, which failed; now operated under central management. Problems similar to those of other projects but efforts to succeed more persistent. Newly drained land was difficult to cultivate. Bogshoes on horses and special plowing equipment were used. Seven to eight years elapsed before soil was sufficiently dry to be plowed readily and by that time soil was so acid that crop production seemed impossible. Sulphates left by sea water turned acid as they decomposed. Application of lime offered only partial relief. Twelve to 16 tons of calcareous sand applied per acre and mixed with peat soil to improve its structure. Now potatoes, corn, cane, cotton, and several vegetable crops are grown. Pasture and livestock programs are small. It is still difficult to keep the project out of the red and much investment must be charged to experimentation.

(14) Avoca Drainage District (No. 5); 13,200 acres. Project seriously damaged by flood of 1927. Over one-half million dollars spent

on project. Fields are now flooded and serve duck hunting club.

(15) Upper Terrebonne Drainage District (No. 6); 4,240 acres.

Storms and seepage proved major problems as did disagreements between settlers and land development company. Project abandoned.

(16) Various other projects (such as Nos. 32, 33, 34, 38, 39, 40, 41, 42, and 43).

All abandoned. (Barataria Quadrangle, U. S. Geological Survey, shows water-filled fields for No. 33.)

Prospective Pump Reclamations

Past reclamation efforts in the marshlands have demonstrated rather clearly how not to reclaim these lands. The ratio of expenditures to income or of profits to losses has been decidedly unfavorable and, it would seem, discouraging. This experience, however, has by no means dulled the hopes of reclamation enthusiasts. Local supporters point out that the land is there, the people or prospective farmers are there, the need is there, and who is to say that the know-how and ability do not exist in this land of advanced technology? Capital is needed and in much larger amounts than was spent in previous reclamation efforts. Regarding this problem the widened scope of federal interest in development projects has been noted and the prospects for marshland reclamation are locally considered to be decidedly favorable.

Hope for Renewed Pump Reclamations.

That the desire to reclaim the marshes is a persistent one is borne out by the relatively recent attempts of the Plaquemines Parish Police Jury to reclaim by pumps some marshland in the lower part of the parish. Reminiscent of advertisements seen in abundance 35 to 40 years ago in Louisiana newspapers, the following notice, accompanied by the picture of a large dredge, appeared in the *Times Picayune* of January 20, 1939:

"Pictured above is the powerful hydraulic dredge 'Illinois' excavating a 65-foot drainage canal in Plaquemines Parish, La. Together with three pumping stations now being installed, it will reclaim over 3,000 acres of alluvial soil and further extend the orange and lily bulb growing belt of Plaquemines Parish. This is just one of the many projects, either completed or in the process, that is making Plaquemines Parish one of the outstanding spots in the entire South to live in or locate industries. . . . Truck farming . . . [has] shown rapid growth. It is suggested that if you are contemplating buying land out in the country or looking for an industrial location that you write . . . for further information about Plaquemines Parish which is just a 'stone's throw' from metropolitan New Orleans."

Only a few of the 3,000 acres were reclaimed. The parish lost heavily on the undertaking. This and many other reclamation endeavors in southern Louisiana, particularly those near the coastal cities, were apparently inspired by land promotion and sale ambitions rather than by true land development aims.

Another interesting proposal for reclaiming marshland is that which appeared March 16, 1946, in the *St. Charles Herald* (published in Hahnville, Louisiana, the seat of St. Charles Parish). This plan involves a large triangular area south of Donaldsonville, bounded on the east by the levee of the Mississippi River, on the west by the high natural levee of Bayou Lafourche, and on the south by the embankment of the Southern Pacific Railroad. This entire basin is drained by Bayou Des Allemands. It is proposed to put a dam and pumping plant at Bayou Des Allemands in the vicinity of the Southern Pacific bridge over this stream and thereby to prevent tidal waters from entering the area, the drainage being pumped over the dam. The federal government was thought the proper source of funds for this proposed work.

Problem of High-Income Agricultural Crops.

Reclamation interests in southern Louisiana have not succeeded in developing an intensive type of agriculture particularly suited to the marshlands. It proved difficult to establish citrus groves except on the higher levee lands, and frost hazard is too great except in the very southern portion of the delta. Some vegetable crops for the early market were tried but were damaged by the cold air which drifted into the low-lying reclaimed fields. These crops also do better on the higher natural levee lands.

Corn was and is the one crop grown on all reclamations. At Clovelly numerous specialty crops have been developed, but this is exceptional. Most of the projects rely on common crops and pastures. Some of the pastures developed on reclaimed marsh are excellent and some of the finest herds of cattle in southern Louisiana can be seen on these pastures. This development, however, admirable as it is, does not represent a sufficiently intensive use of land to justify the original reclamation cost and the high annual upkeep. At the present time no high-value crops have been found suitable. The New Orleans market for vegetables and bulbs has not proved attractive. Potatoes have been produced on some of the projects with fair success but they are difficult to store in the area without expensive facilities, and considerable losses have occurred through improper storage.

Persons long familiar with lower Louisiana frequently remark on the declining intensity of agriculture on the high lands along Bayou Lafourche. Here many former small farms and plots are now in pasture. Thirty years ago they were farmed with intensity and supplied most of the family living and even some cash. Many of the line settlements have become the homes of city or oil field workers. The trend among the small French-

speaking farmers is to seek economic opportunity in the city rather than through intensive agriculture. This is not to deny that rather intensive farming is carried on in certain of the line settlements but rather to point out that the native population has not on the whole shown any particular interest in or ability to develop an agriculture suitable to the high-cost conditions found on reclamation projects. This suggests a subject—the proper source for settlers for reclaimed land in Louisiana—that has troubled and puzzled many students of Louisiana agriculture.

New Land for Whom? In the past, most of the settlement promotion of reclamation companies in southern Louisiana was directed at Corn Belt and Lake State farmers. Seldom were local people considered suitable tenants or purchasers. An exception is Clovelly Farms, where originally local French farmers were received as tenants, but this experiment failed largely because the local farmers were not accustomed to the proposed type of agriculture and accompanying work habits. They also failed to understand the requirements of successful landlord-tenant relations. Factors of depression and certain physical problems in handling soil were also involved. The belief that the native farmers of southern Louisiana will not make suitable settlers for reclaimed land is still rather widely held among reclamation promoters. The local French farmers are considered too inflexible in their farming methods and village life to make good farmers on reclaimed land. In 1924, A. T. Dusenbury, one of the outstanding drainage engineers and marshland drainage promoters, said, "Louisiana has no surplus

population to draw upon and any lands developed there must depend for their tillage almost entirely upon agriculturalists coming from other states and countries."³¹

Agencies of the Louisiana state government have in the past seemingly assumed the attitude that out-of-state settlers for new land areas are to be preferred. Probably few states have engaged in such persistent land promotion directed to outsiders. State literature has been circulated in eastern and northern states and even in foreign countries.³² In recent years this attempt to attract out-of-state settlers has declined. Considering the severity with which the native population presses the available agricultural resources (particularly in lower Louisiana) it would seem desirable in future reclamation to consider ways to utilize the local population as settlers. If the federal government is drawn into marshland reclamation it will likely be on the basis of aiding the native population to acquire additional land resources and thus to gain economic opportunity. Admittedly the question of settlement would be a complex one. The local population has shown no special interest in the intensive types of agriculture that alone can support costly reclamation; immigrant groups have frequently found the French-speaking communities uncongenial. This difficult social problem must be faced.

Who Will do the Job? Land reclamations on a local basis have clearly run their course in the marshland area of southern Louisiana. While some fortunes have been made, a great number of small investors lost their savings in doomed enterprises. It does not seem likely that

³¹ A. T. Dusenberry, "Drainage and Flood Control in Louisiana," *National Reclamation Magazine*, July 1924, p. 122.

³² See Walter M. Kollmorgen, and Robert W. Harrison, "Notes on the French-speaking Farmers of Southern Louisiana," *Economic Geography*, May 1946; also Robert W. Harrison and Walter M. Kollmorgen, "The Place of the French-

speaking Farmers of Southern Louisiana in Future Land Development Programs," *Journal of Land & Public Utility Economics*, August 1946. These two papers deal at some length with the social and economic questions involved in land reclamation in the Louisiana French country.

this performance will be repeated. Federal funds are now being sought for future reclamation efforts in this area. But what agency or agencies will be designated by public policy to develop these lands? Several agencies are interested in the Louisiana marshlands and have advanced widely ranging programs for their economic development. Among these are the Corps of Engineers, U. S. Army, associated with flood-control work, the Soil Conservation Service, the Bureau of Reclamation, and the Louisiana Department of Public Works.

The work of the U. S. Army Engineers in major stream improvement for navigation and later for flood control is well known. Less well known is the fact that the War Department under a provision of Public Law 534, 78th Congress, 2nd session, is charged with responsibility in the field of major drainage. This law specifies that assistance from the War Department toward the problem of drainage shall be confined to work on major streams. This vague instruction is open to many interpretations. The interpretation it will be given is of paramount interest to students of land policy. It is too early yet to predict the full implications for the alluvial valley of this little publicized legislation. Already an important drainage project has been approved in the Boeuf Tensas Basin of northeast Louisiana, and other similar projects are under favorable consideration. It should be noted that the presumed limitation, "major drainage projects," is most elastic and with studied application can be developed to reach into almost every drainage area. This extension of flood control to include drainage is in a sense logical because the utility and effectiveness of the flood-control programs are now severely limited by the serious drainage problems that have developed behind the artificial

levees. In fact, in many instances the drainage problem has been aggravated by the artificial levees.

Of equal significance to the marshlands is the pending legislation which would extend the official territory of the Bureau of Reclamation of the Department of the Interior. Ever since that Bureau was created in 1902 to reclaim through irrigation the arid lands of the Western states, there has been talk and discussion of extending its activities to lands which require reclamation through drainage and other operations. Development interests, such as chambers of commerce, real estate associations, and others (including colleges of agriculture), have from time to time strongly favored this proposal. Just before the first World War, when the Louisiana marshlands were being in part reclaimed by pump-drainage projects, there was intense discussion of methods for starting large-scale projects under the direction of the Bureau of Reclamation. The war and later the failure of most of the marshland reclamation projects with great loss to investors quieted for the time the idea of changing the official territory of that bureau.

Now stimulations of wartime prices and the need to think of opportunities for veterans and the oncoming generation give new life to proposals furthering development of the alluvial valley, including the marshlands, and again the Bureau of Reclamation is being considered for the job. The movement of the Bureau of Reclamation into the alluvial valley, should it take place, would raise some interesting questions of land policy. Would the family-farm philosophy practiced by the Bureau on irrigated projects be transferred to the alluvial valley of the Mississippi, where traditional patterns often conflict with this view and where the physical setting encourages large-scale

mechanization and therefore farms, possibly larger than that of typical family size? This prospect inclines the plantation operators to prefer a development program sponsored by the Army Engineers although numerous town merchants prefer a program that would result in a multiplication of free-spending, small commercial farmers.

Another federal agency that might possibly undertake or assist in reclamation in the marshlands is the Soil Conservation Service of the Department of Agriculture, which is already operating in many of the swampland areas of Louisiana and is working on the problem of inefficient and neglected drainage ditches. Directly and indirectly, this agency can already offer much aid in the form of planning local drainage programs, providing earthmoving equipment, and in various ways provide subsidy to local land development. These aids, however, can lead only to local and fragmentary forms of land development because the problem which now overshadows all others in the alluvial valley is one of adequate outlet of outfall ditches or streams. These are as yet almost non-existent although millions of dollars have been spent to provide them locally. To provide these on an adequate scale in this area of gradual slope and to integrate them properly is a task of such magnitude that no existing plans encompass them in more than fragmentary form.³³ Nor is it clear at this time whether the authority and the means of the Soil Conservation Service will be expanded sufficiently to tackle this job realistically. If its authority and means are expanded, this agency would be in a position to attempt marshland reclamations.

Although state and local governments have not usually coped effectively with flood control and drainage problems,

state agencies designed to deal with these problems survive. They will want to play their part in new and expanded programs. Such an agency is the Louisiana State Department of Public Works. It has made and is now carrying out large plans to improve and expand drainage programs in Louisiana. Its main problem is one of means. The present widespread tendency to look to the federal government for funds to carry on such projects does not suggest the financing of a large-scale program of land development by local and state money. Consequently this agency seeks to establish an area of responsibility and activity in combination with one or more federal agencies that may give increased attention to drainage reclamations.

Summary Statements and Impressions

As stated in the introduction, this paper is not a brief for or against marshland reclamation. It is a report on past efforts and their results and "straws in the wind" concerning the possibility of future federal reclamation efforts in this and other areas. What has happened in the past may happen again with regard to enthusiasm, work, and results. If there is federal reclamation here, will it be successful? The activity of plenty of promoters and even favorable congressional action guarantees nothing of the sort. Federal programs can and do survive repeated failures, changes in purpose, methods, and objectives. Classic examples of this are furnished by the history and programs of federal and state land reclamation agencies and the history of river navigation and flood-control programs in this country.

A review of the history of marshland reclamation suggests that many problems present themselves in this effort for which

³³ The drainage work of the U. S. Engineers mentioned above may do much to solve the outlet problem.

no answers or solutions have been found. Among these are soil compaction, soil acidity, excess seepage, ditch maintenance, high cost of pumping and general land development, failure to find high-value crops and energetic, competent farmers or field workers, and flood dangers from the Gulf or the Mississippi. Adequate or promising solutions to these problems should be found before public money is spent on further attempts at reclamation.

Sound public policy suggests that preliminary to further large-scale reclamations in this area "pilot reclamations" be attempted. This seems a logical procedure and might forestall hasty and ill-considered action precipitated by crisis.

It seems clear that if land reclamation is to be carried further in the lower Mississippi Valley we will have to re-examine our complex flood-control program in that area. Is there justification in providing flood protection for millions of acres of low-lying swampland that cannot be reclaimed economically under present procedures? Is it worthwhile to dike main streams when flood waters accumulate behind the dikes and so jeopardize the expansion of farm land? In fact, much or most of the land already in farms has such poor drainage and prospect for drainage that farming is most hazardous and land abandonment often seems appropriate. In part, this problem could be attacked by a sensible program of controlled siltation and a consequent building-up of the land. Increased elevations of 5 to 10 feet, which could be effected in the span of relatively few

years, would help materially in a drainage program designed to expand agricultural lands. Moreover, this would conserve the valuable soil material that is now directed and dumped into the Gulf. It is interesting to note that American technicians are already doing just this with apparent success in our sister republic, Honduras. These same technicians view with alarm and concern our method of working against, rather than with Ol' Man River.³⁴ Here again, public policy should be flexible enough to permit the establishment of "pilot siltation projects."

It appears that we would also do well to re-examine our national habit of trying to provide land for the unemployed and underemployed. In a day of largely subsistence farming and free or low-cost land, this program had much to commend it. But now farming is largely commercial, and we are much preoccupied with all manner of legislative paraphernalia to maintain prices for agricultural products. Furthermore, land reclamations now call for heavy subsidies. This raises the important question whether subsidy funds are best used to develop more land. Many of our large cities have filthy slums that ought to be rebuilt. Also, a large proportion of rural housing can be classified as slums. Other opportunities for subsidies and employment lie all about us. They include reforestation; retirement of worn-out, eroded land; development of parks and recreation centers; building of roads, hospitals, and decent homes for the aged; stream sanitation; health programs, etc. The list can be expanded to pages in length. Indeed, we have only begun to build America.

³⁴ Charles Morrow Wilson, "River Come Closer to My Door," *Scientific Monthly*, February 1946, pp. 117-126.

Land Tenure in Bolivia†

By DAVID WEEKS*

BOLIVIA'S frequently adjusted boundaries now embrace lands almost equal in extent to the combined areas of California and Texas.¹ For the purpose of economic, social, or political exposition this area may be divided into three great regions.

The highlands of Bolivia, residing place of the greater portion of her three and one half million people, seat of her government, scene of her more important economic activities, rich in their anthropological, archeological and ethnological interest, are known today as the *Altiplano*. These highlands, shown in Figure 1, are perched more than 12,000 feet above the Pacific Ocean from which they are isolated by the peaks and desert slopes of the westernmost range of the Andes. The agricultural and grazing land of the *Altiplano* are known as *punas*. To the east of the *Altiplano* the land breaks but, before dropping into the eastern lowlands, the *Cordillera Real* thrusts its massive peaks another 10,000 feet and more above the plateau and then drops precipitately to the extensive tropical and subtropical plains called the *Oriente*. The extensive plains of the *Oriente* are called *llanos*. The great mountains and their narrow valleys, separating the *Altiplano* from the *Oriente* are called the *Montana*. The agricultural lands of the *Montana* are frequently referred to as the *valles*. Although both ranges of the Andes have been pierced by railroads and highways, and regular airplane service has been es-

tablished, the economic and cultural patterns have been and still are shaped by these formidable barriers.

On the *Altiplano*, Inca and pre-Inca institutions, in a better state of preservation, perhaps, than the sculptured stone construction of the megalithic age have withstood the effects of time and of the Spanish conquest which reached Peru in 1526 and the highlands of what is now Bolivia about 1533.

It was on the *Altiplano* and in the adjacent mountains and valleys more than in the *Oriente* that the Spaniards early became firmly established. Chuquisaca was founded in 1538 on the site of the Indian village of Guayacacha among the mountains near the southwestern rim of the *Altiplano*. Chuquisaca became the capital of the *Audiencia de Charcas* established in 1559 and which began to function in 1561 as frontier representative of the Spanish Crown.² Chuquisaca, also called at one time La Plata, and another Charcas, in 1839 became Sucre,³ the present-day legal capital and cultural center of the Republic. La Paz, however, became the actual seat of government except for the judicial branch and certain other activities which remain at Sucre.

The *Audiencia de Charcas* was the birthplace of many of the ordinances and royal decrees which became welded into the legal structure of property rights throughout Spanish America. The laws and customs of the Spanish colonies,

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¹ Important quantitative and other data used throughout this article has been obtained for the writer by Mrs. G. F. Mehls from the Gabinete Topografico, Direccion General de Colonizacion, Ministerio de Agricultura, Ganaderia y Caza, La Paz, Bolivia, March 1946, and from

other sources. The area of Bolivia is 1,069,886 Km., 106,888,600 Ha., 411,127.7 sq. mi. or 264,121,730.6 acres.

² Roberto D. Levillier, *Vidal Judicial y Politica Audiencia de Charcas-Correspondencia Vol. 1*, Prologue (Madrid: 1913).

Jose Maria Camacho, *Historia de Bolivia* (La Paz, Bolivia: Gisbert y Casanovas, 1943), p. 70.

³ The various names of Sucre are important to one desiring to trace the history of Bolivian land tenure.

moreover, reflected the influence of the agrarian patronage of primitive Rome, Germany, and Africa and of ancient and medieval Spain. This European and colonial background has been presented in two earlier articles.⁴

The fusing of these Spanish laws and customs with those of the aboriginal populations created the Bolivian land system of the Spanish Colonial period. This colonial land system fixed by nearly three centuries of its existence became with little change the law and custom of the Republic created by the Revolution against Spain—initiated in 1809 and concluded in 1825.

Here in the highlands the major part of Bolivia's population is still concentrated in numerous drab Indian Villages and a few fairly large and flourishing cities. Of these, Potosi and Oruro are strictly mining centers. In La Paz and in Cochabamba, both modern cities, reside many of the *partónes*, absentee owners of the large *haciendas*. These *haciendas* and the Indian communities make up the two

dominating types of agrarian organization in Bolivia. Under these aristocratic descendants of the Spanish colonists, Indian descendants of the Collas, speaking a language now called Aymará, and certain Quechua speaking tribes support an archaic agriculture only partly adequate for supplying the nation's food requirements. Although there are encouraging beginnings of modern agriculture, this system is characterized generally by inferior livestock, the wooden plow drawn by oxen, the flail still used for threshing and, among Indians, an extremely high degree of illiteracy and a low plane of living. In some parts these Indians are still submitting to the degradation of the whipping post.

The Aboriginal Background

The aboriginal background of Bolivian land tenures is important, first, because of the economic and social importance of the Indian himself, second, because the institutions under which he lives and works are counterparts of those of his ancestors remodeled along Roman-Gothic lines and, third, because of the prominent place occupied by primitive Bolivian societies in discussions of the origin and nature of property and of the solutions of present-day problems. Pure-blooded Indians comprise more than half the nation's population, mixed breeds more than a quarter. In sharp contrast with the rural population of the United States, those who work the soil in Bolivia are for the most part Indians, reduced through the blending of ancient aboriginal and European institutions to a semi-serfdom. But the ancient as well as the modern land systems of the indigenous races of Bolivia have a world-wide



Courtesy of the *Geographical Review*, published by American Geographical Society of New York.

⁴David Weeks, "European Antecedents of Land Tenures and Agrarian Organization of Hispanic America," *Journal of Land & Public Utility Economics*, February 1947.

David Weeks, "Land Tenure and Agrarian Organization in the Spanish Colonies of America," *Journal of Land & Public Utility Economics*, May 1947.

significance from a scientific viewpoint. Upon him, therefore, who would write about Bolivian land tenures, rests a responsibility of making some effort to clarify the interpretations which have been made of land tenures among the primitive races of the Andes.

For a general setting of that earlier period before the Inca dynasty was initiated, the constructive though somewhat imaginative writings of Means⁵ are suggested, along with the more tempered contributions in the Handbook of the Smithsonian Institution.⁶

The Inca land system has been treated in many of the early writings of the Spanish chroniclers and has been covered in more or less detailed discussion by such modern writers as Markham,⁷ Means,⁸ Diffie,⁹ Belaúnde,¹⁰ Latcham,¹¹ Baudin,¹² and Cunow.¹³

Pre-Inca Tenures—the Collas. The Bolivian plateau comprising the Lake Titicaca basin was formerly inhabited by a strong federation of Indians known collectively as the Collas. The great Empire of the Collas, having a considerable degree of culture, and a military strength almost equal to that of the Incas, is said to have been formed with its capital at Tiahuanaco sometime between 500 and

1000 A.D.¹⁴ Like the Incas they were a federation of Indian tribes and, when the Collas were conquered by the Incas, they are said to have contributed much to the development of the culture of the latter.¹⁵

Not less than ten Spanish writers of the early colonial period have described the pre-Inca political organization in terms of the medieval Spanish *beheirra*.¹⁶ From the accounts of these chroniclers and what is known about the earlier *beheirra* it may be concluded that under the pre-Inca agrarian organization, as it existed outside of the Inca empire prior to the Spanish Conquest, the land of any given local area was settled and partitioned among those who had conquered and occupied it independent of any higher sovereign. Property rights at first were vague and confused. However, out of the relationship between conqueror and conquered there developed a system of vassalage—large landed estates operated by serfs under a proprietorship referred to by early Spanish writers as individual.¹⁷

The sequence of the emergence of individual ownership of land on the one hand, and of collective ownership on the other, is uncertain but there is no un-

⁵ Philip Ainsworth Means, *Ancient Civilization of the Andes* (New York, London: Charles Scribners Sons, 1931). Contains detailed list of sources.

⁶ Philip Ainsworth Means, "A Study of Ancient Andean Social Institutions," *Transactions of the Connecticut Academy of Arts and Sciences*, September, 1925 pp. 407-469.

⁷ *Handbook of South American Indians*, Smithsonian Institution, Bureau of American Ethnology, Bul. 143, Vol. 2, The Andean civilizations. Julian H. Steward, Editor, Washington: U. S. Government Printing Office, 1946.

⁸ Sir Clements Robert Markham, *The Incas of Peru* (New York: E. P. Dutton and Company, 1910). See also his long list of translations published by the Hakluyt Society of London. The works of Markham have been somewhat discredited because of the inaccuracies of his translations and an apparent bias against the Spanish conquerors. He must be given credit, however, as a pioneer and guide for further study.

⁹ *Ibid.*

¹⁰ Bailey W. Diffie, *Latin-American Civilization* (Harrisburg, Pa: Stockpole Sons, 1945).

¹¹ Victor Andrés Belaúnde, "Hispanic America, II Incan Communism and Bolshevism," *The Rice Institute Pamphlet*, October 1923, No. 4, pp. 184-201.

¹² Richardo E. Latcham, *La Existencia de la Propiedad en el Antiguo Imperio de los Incas*, (Santiago, Chile: Imprenta, Litografía Universo, 1923).

¹³ Louis Baudin, *L'Empire Socialiste des Incas* (Paris: Institute D'Ethnologie, 1928).

¹⁴ Heinrich Cunow, *Die Soziale Verfassung des Inkareichs* (Stuttgart: Verlag von J. H. W. Dietz, 1896).

Heinrich Cunow, *Geschichte und Kultur des Inkareichs* (Amsterdam: "Elsevier," 1937).

¹⁵ Means, *A Study of Ancient Andean Social Institutions*, p. 443.

¹⁶ Means, *A Study of Ancient Social Institutions*, p. 449.

¹⁷ Roberto Levillier, *Don Francisco de Toledo, Tomo II Sus Informaciones Sobre los Incas 1570-1572* (Buenos Aires: Colección de Publicaciones Históricas de la Biblioteca del Congreso Argentino, 1940). Levillier quotes the Quipocamayos, p. 208; Cieza de Leon, p. 209; Polo de Ondegardo, p. 211; Sarmento de Gamboa, p. 212; Acosta, p. 215; Ore, p. 216; Herrera, p. 218; Calancha and Montesinos, p. 219 and Cobo, p. 220, all of which use the term *beheirra* in describing pre-Inca political, social and economic organization.

¹⁸ See Levillier pp. 211 and 215 and Baudin, who presents a somewhat different point of view, p. 101.

certainty concerning the existence of both among the pre-Inca civilizations. Thus, as in southern Europe, however, it may have been acquired and whatever may have been the sequence, individual property in land existed side by side with collective property long before the white man came, and even before the Incas acquired dominion.

The pre-Inca community in which proprietorship of land was vested has been described by many writers. The primitive community is presumed to have consisted of a village of crude houses of earth or stone and a fort (*pucura*) built on top of a hill around which were the fields of the loosely organized families held together by ties of kinship, informal understanding, and the need for mutual protection. As the political organization became more complex, villages were made up of one or more kinship groups called *ayllus*. The *ayllu* is said to be the early predecessor of many of the present-day Bolivian communities still known by that primitive name. A number of *ayllus* constituted a tribe. Villages became also grouped or federated by ties of mutual interest or for protection within territorial limits called *marcas*. Strange as it may seem, the pre-Inca and pre-Spanish *marca*, so named in the Quechua Indian language, is quite similar to the territorial unit having the designation of *mark* or *marca* in primitive Germany.¹⁸ Opinion differs as to whether it was the *ayllu* or the *marca* which owned the land of the pre-Inca community. Probably both of these conditions of ownership prevailed in different localities.

Collective Property in Land Under the Incas. Under the Incas the pachaca of one hundred families became the basic agrarian unit and is thought by some to have

taken the place of the *ayllu* or the *marca* as the proprietor of the community lands which were divided among the heads of the household or *purics*.¹⁹

Notwithstanding frequent references to annual distribution of the land it is now fairly well established that in the Inca agrarian community, land was distributed only in the opening of new territory or in replacing worn-out land with that which had been restored by years of fallow.²⁰

There were no lawsuits between individuals over land boundaries for within the community there was no individual ownership, but there were many suits between communities in which ownership rested.²¹

Continued occupancy established a hereditary right in the usufruct, rather than in the land itself, which was recognized by others and which in a sense was a property right. The agrarian community therefore, was characterized by collective ownership of the land and, although there was much cooperation, by individual enterprise in production. Pasture and forest lands, however, pertained to the community and were for the free use of all, but to which nobody could declare an individual right.

Through a system of forced colonization large masses of people were moved by the Incas with or without their consent from one part of the empire to another. The lands assigned to these colonists (*mitimaes*) "were given in perpetuity for themselves and their descendants in place of those which they had left." They could not alienate them, which was in conformity with the general custom. They belonged as much to their descendants as to themselves. The usufruct of these lands was their property

¹⁸ Cunow, 1937, pp. 135-139.

¹⁹ Polo de Ondegardo, Juan, *Informaciones acerca de la religión y gobierno de los Incas*. Notas biograficas y concordancias de los textos, por Haracio H. Urteaga. Biografia de

Polo de Ondegardo, por Carlos A. Romero. (Lima: Imprenta y Libreria Sonmarti y ca., 1916), p. 70.

²⁰ Cunow, 1937, pp. 139-140; Latham, pp. 42 and 43.

²¹ Polo de Ondegardo, pp. 45-96.

while they lived and occupied them. In case of death without descendants they were apportioned to others in the same community.²²

Private Property in Land Among the Incas. The improvements of the homesite (*solar* or *muya*) fruit of labor, did not form a part of the community property but were exclusively the individual property of the one constructing them, conserving them in perpetuity for himself and his descendants. All the works which had resulted from the collective force of the group, however, and which was necessary for the common good, and in general the land including that of the *solar*, was held as common property of the community,²³ in theory if not in practice by the grace of the Inca.²⁴

A passage from Polo de Ondegardo confirms the fact that there was another kind of private property in land held as a grant from the Inca,²⁵ to the nobles as were the *curacas*, lords of the vassals, and to those of royal blood.

Lands Dedicated to Religion and to the Inca.

A large area of land was dedicated to religion and to the Inca. These are the lands that became the legal basis of land grants made after the Spanish conquest and as such have an important relation to the present day *haciendas*. It was from lands thus designated that the Indians paid tribute in support of religion and of the elaborate court of the Inca ruler together with all of the people engaged in public service including those in the army and many of noble birth and the families of all of these. The lands of religion may have represented from a third to a fourth of the total area of arable pasture and hunting lands.²⁶ Concerning the extent of the land of the Inca,

Polo de Ondegardo says that "there is no doubt but that of all three (i.e., the lands of the Inca, of religion, and of the communities) it was the greatest."²⁷ These Inca lands, as well as those dedicated to religion, were seeded and harvested by all of the able-bodied members of the community; the aged, sick, and widowed being excused from this contribution.

Thus the major types of land ownership among the Incas at the time of the Spanish conquest were the collective rights in land used under a system of individual enterprise for the sustenance of the common people; grazing commons; individual rights in residence property; inheritance estates granted by the Inca as recompense for special service or recognition of rank; rights claimed in the name of religion or of idol worship; and a similar claim by the Inca ruler upon the proceeds of other lands for the maintenance of members of his household and of large populations engaged in public service.

Origin of Present-Day Landed Property Rights

Polo de Ondegardo insisted that although the produce belonged to the Inca and to religion, the lands of religion and the Inca in reality belonged to the Indians themselves and to their descendants through their communities and community chiefs. Others of the Spanish colonial period argued that property in these lands was that of the Inca and of religion and that as such became by right of conquest the property of H's Majesty, the King of Spain.²⁸ The latter argument prevailed and large areas were confiscated and granted to the Spanish conquerors. The rights acquired by the

²² Latcham, p. 26.

²³ Latcham, pp. 39-40. Cunow does not distinguish between land and improvements when he designates the *muya* as being individual property. Cunow, 1937, pp. 140-141.

²⁴ Latcham, pp. 49-50. Also see Polo de Ondegardo, pp. 69-70.

²⁵ Polo de Ondegardo, pp. 73-74.

²⁶ Polo de Ondegardo, p. 58.

²⁷ Polo de Ondegardo, p. 59.

²⁸ Polo de Ondegardo, pp. 60-61.

Indian chiefs (*curacas*) prior to the conquest were respected by the Spaniards. Large tracts of land belonging to the communities of Indians, however, were occupied without authorization and finally the titles of these with those of the *curacas*, the Inca, and of religion were confirmed as individual titles under the system of *composicion de tierras* described in an early article.²⁹ These colonial confirmations were respected by the Bolivian Republic.

Additional sources of landed property were the lands of the Indian communities (*tierras de origen*) which were not occupied illegally during the colonial period and became a matter for long and serious consideration by the Republic, and the wild lands (*baldfos*) which at the time of the formation of the republic had no signs of survey or boundary marking.

Present-Day Tenures in the Bolivian Highlands

The predominant types of tenure on the Bolivian *Altiplano* are represented by the land holdings of the Indian communities and of the *haciendas*. The most urgent tenure problem is the status of the Indian agricultural workers in relation to their *patr6nes*.

Land Holdings of the Communities. Of the lands of the Indian communities of the *Altiplano* (*tierras de origen*)³⁰ a portion has passed into the possession of the state as excess community land (*sobrantes*) a large part of which has been sold to individuals. A quantity also has been adjudicated as individual property of half-breeds and others not of Indian descent, title having been confirmed on the basis of fifteen years' possession. Some community land has been adjudicated as individual prop-

erty of the Indians who occupied them. Much Indian community land still remains undivided but with its status of ownership greatly changed in theory at least, from that of the ancient, colonial, and early Republic communities.

The communities which persisted as such retained their basic pre-Spanish characteristic of collective land ownership until President Melgarejo in 1866³¹ declared the communities to be nonexistent and their lands the property of the state subject to alienation to the Bolivian aristocracy. Although this decree confiscating the Indian lands was in part annulled and in part amended by subsequent legislation, a basic change took place from 1871 onward in the way in which the lands of these communities might be held. Community Indians of all classes were given the absolute right of property (*dominium directum* and *dominium utile*) in the lands in their possession. Surplus community lands, however, were to remain, as Melgarejo had decreed, the property of the state. The law of 1874 specifically stated that communities were not to be recognized. No individual or group was permitted to take the name of *comunidad* or *ayllo*, nor to be represented as such before any authority.³²

In 1880, however, a tendency to relax somewhat the determination to abolish community holdings was indicated³³ and in 1881 the right to hold land as individual property, undivided (*proindiviso*), was extended to all communities or subdivisions thereof recognized by the customs of the locality whose members desired such form of ownership. Some communities were and are today divided into subdivisions (*estancias*, *secciones*, and *parcialidades*). These subdivisions repre-

²⁹ David Weeks, "Land Tenures and Agrarian Organization in the Spanish Colonies of America," February 1947, pp. 60-75.

³⁰ Mario C. Araoz, *Neuva Digesto de Legislacion Boliviana*. Tomo II (La Paz, Bolivia: Editorial Renacimiento F.S.R. y Cia. 1929) *Exvinculacion de las tierras de comunidad*, pp. 178-209.

³¹ J. Lavadenz, *La Colonizaci6n en Bolivia* (La Paz, Bolivia: Talleres Gráficos de la Intendencia de Guerra, 1925), pp. 6-7.

³² Araoz, *ibid.*, Ley de 5 de octubre de 1874 art 7 p. 179.

³³ Araoz, *ibid.*, Decreto de 1 de diciembre de 1880 p. 189.

senting a social stratification among the inhabitants of the communities based probably upon their origin, status as conquerors or conquered (whether they occupied the lands earlier or later than the other groups) and upon other causes of differentiation, were to become groups of proprietors each composed of individuals holding undivided shares in the lands of the community or group. The board of adjudication, however, was required to use every means in their power to persuade the Indians to divide their land and become individual proprietors, but the Indians must not be forced to do so against their wish.³⁴

These individual property rights of the Indians were alienable and subject to mortgage, only with the intervention of designated public officials. By this means it was hoped the Indians would be protected against loss of their only means of subsistence.

Thus, although the method of holding community land had been changed, the outward appearance and many of the ancient legal procedures and customs have continued in the communities held intact by the modifying legislation, and by failure to expedite the enforcement of the details of the basic law. The process of enforcement has continued throughout many decades without completion. This is the vague tenure status of the communities existing in reduced numbers in the highlands of Bolivia today, partly Roman-Gothic, partly Incaic. It does not seem correct, however, to call their land communal as McBride has done.³⁵ The members legally are proprietors of undivided shares in community property. They still present the picturesque aspect but deplorable plane of living of a primitive civilization.

The Hacienda of the Bolivian Highlands.

³⁴ Araoz, *ibid.*, Resolución de 16 de agosto de 1881 pp. 197-198; Decreto de 30 de diciembre de 1881, p. 199.

Proprietorship of the *hacienda* of the *Altiplano*, limited by the emphyteutic rights of the agricultural workers or *colonos*, rests in a *patrón*, member of the Bolivian aristocracy.

The relation between *patrón* and *colono* is, in a sense, one of joint proprietorship, the *patrón*, of course, having assumed the major share in the property rights, and a monopoly in its management. Similar to the ancient emphyteuta of southern Europe, the *colono* has acquired, by inheritance or continued residence for two consecutive or three discontinuous years, right to the usufruct of an unspecified area, within the estate, presumed to be sufficient for the subsistence of himself and family. In addition to the fields (*chacaras*) thus allotted to him, the *colono* also has obtained by the same means a similar precarious title to a lot upon which he or his ancestors have built an adobe hut for his family's residence and the right to pasture his few animals on the grazing lands of the *patrón*.

In consideration for the above tenure status, the *colono* has been required to work a customary number of days, usually three or four, each week in the cultivation and harvesting of the crops of the *patrón*, provide work animals in working the fields of the *patrón*, take his turn in herding livestock on the grazing lands of the *patrón*, work with his wife as household servant in the home of the *patrón*, be it on the *hacienda* or in some distant city, deliver the products of the *patrón*, either to his home or to market, perform a number of other petty and menial tasks, and contribute various kinds of products from his own fields for the use of the *patrón*. The system is a relic of colonial *yanacónaji*.

The right gained thereby and protected by law is not title to any specific

³⁵ George McCutchen McBride, *The Agrarian Communities of Highland Bolivia* (New York: Oxford University Press, 1921), p. 10.

tract of land either as freehold or leasehold, but to an opportunity to work the land assigned to him, usually in the fall, but whenever and wherever the interests of the *patrón* dictate. If the latter desires to develop a certain portion of his estate for a particular purpose, such as the growing of intensive crops under irrigation, he does not hesitate to move the *colonos*, who happen to reside and work their fields thereon, to some other part of the *hacienda*. But he cannot evict them from the *hacienda* except for cause defined by law.³⁶

Cause for eviction consists primarily in refusing to give services in the labors of seeding and harvesting the crops of the *patrón* or the perpetration of some crime. The law of 1937 specifically declares that failure to perform personal services unrelated to agriculture is not cause for eviction. This clause is only an echo of a multitude of such declarations incorporated hundreds of years ago in the laws of Spain and of the colonies and later of the Republic, but its enactment has been followed by louder and more insistent demands for enforcement, and unrest among the Indians is increasing. During the present year (1947) an Indian uprising on the *Altiplano* resulted in the death of a *patrón* and another member of his family. La Paz was threatened with attack and 140 Indians and their families were exiled to the wilds of the Rio Ichilo in the *Oriente*.

Recent Attempts at Agrarian Reform on the Altiplano. The new constitution drawn up in 1938 and promulgated the following year declared that slavery does not exist and that nobody may be required to give personal services without just retribution and without his complete consent.³⁷ Reiteration of similar declarations is proof that a situation bordering on slavery has

existed up to very recent times. On the 15th of May 1945, President Villaroel repeating the above constitutional provision and a similar demand made by the Great Liberator, Bolivar, in 1825, promised to make these declarations effective. On that day he issued four decrees.³⁸ The first of these would abolish the most obnoxious of the personal services (*pongueaje* and *mittanaji*, those required of men and women respectively as servants in the homes of the *patrones*). The other decrees declared the prevalence of infractions of the law with regard to ten or more other types of personal service and provided for just compensations therefore or regulated performance; prohibited the *patrón* from requiring the *colono* to contribute certain species of products; provided for the drawing up of an agrarian labor code, and gave a set of rules to be followed in the interim until the code should have been promulgated; set a maximum of four days a week or whatever was customary if less than that to be served by the *colono* in the performance of agricultural labor for the *patrón*, the amount of this service to be established in advance; continued, where it had been customary for the *colono* to provide them, animals for work on the *hacienda*; and provided for the enforcement of the existing laws requiring *patrones* to establish educational facilities for the *colonos*. The *patrones* know that if they comply with this last provision they will lose their labor force for it is lack of education rather than "debt peonage" which holds the Bolivian *colono* on the land which he is legally free to leave if and when he can find an alternative means of livelihood which appears to be more attractive. The problem is, how to educate the *colono*, make his situation attrac-

³⁶ Araoz, *ibid.*, *Constitucional Política del Estado* de 1938. Tomo IV.

³⁷ Copies of these decrees were supplied by Gustaf F. Mehlis of La Paz, Bolivia.

³⁸ Araoz, *ibid.*, Decreto-ley de 25 de febrero de 1937, Tomo V, p. 85.

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Indio (1946).

tive, and at the same time benefit rather than harm the *patrón*.

The solution of the agrarian problem probably lies in the education of the *patrón* himself. He makes the laws. He enforces them or not according to his convenience. His action rather than words or laws are a solution. But there is a very real possibility of another solution—an agrarian revolution. The frequency of Bolivia's revolutions are well-known to the entire world. A revolution in 1943 swept Villaroel into power. Another in 1946 ended his regime and his life. What relation this last convulsion may have had to his proposed reforms is unknown. He was accused of being a Nazi and a dictator. Such events and political conditions are not conducive to reform.

Early in 1947 Enrique Herzog was seated in the Presidency by a closely contested election. He has made the following statement of policy on the agrarian problem: "The question of the Indian is a matter the satisfactory solution of which depends upon a new agrarian regime which would convert the Indians into production elements of high yield through the scientific exploitation of their own lands."³⁹ How long a time President Herzog will be given to carry out his proposal will be determined by an impatient public, ignorant of the magnitude and requirements of the task, influenced by strong personal interests.

Meanwhile, President Herzog's charge d'affaires to Peru, Carlos Ganzalo de Saavedra, nephew of a former president, has issued a pamphlet⁴⁰ on the agrarian problem which had a distinctly socialistic point of view. Saavedra's proposal, however, is to leave the land in private ownership as he believes that to change the

basic concepts of property would be too revolutionary and too difficult. Production would be collective, *patrón* and *colono* sharing equally in the net proceeds. The status of the Indian would be that of a minor and in his business relations with the *patrón* he would be represented by an officer of the state. Thus, Saavedra would completely reverse the order of the ancient Indian system which as noted above was collective ownership of the land and individual enterprise in production.

It remains for the Bolivian people themselves to determine whether their agrarian system should be socialistic, individual enterprise or remain the responsibility of an enlightened landed aristocracy. It would seem that the latter might have practical advantages over the more revolutionary reform proposed by Saavedra. The English system of regulated tenancy and tenant right valuation would seem to be, along with a vigorous educational program, a promising alternative to collective farming, and one that might prove profitable to landlord, tenant, and to the consuming public.

Successful agrarian reform in the highlands of Bolivia will depend upon the willingness of the *patrón* to inform himself and the capacity of the Indian to be educated and to assume the responsibilities of self-direction. Opinion differs with respect to the existence of such a capacity. "Cupidity, low cunning and savage cruelty" but "not at all stupid" are the words used by Bandalier in describing the Aymara.⁴¹ The words "lazy" and "dishonest" are also used by Bandalier and many others. Two official visits to Bolivia of several months each during which close observation of the *patrones* and *colonos* of the *Altiplano* has been

³⁹ *La Razón*, La Paz, Bolivia, March 21, 1947, p. 9.

⁴⁰ Carlos Ganzalo de Saavedra, *El Problema Integral del Indio* (La Paz, Bolivia: published by the author, November 1946).

⁴¹ Adolph F. Bandalier, *The Islands of Titicaca, and Kooti* (New York: The Hispanic Society of America, 1910) pp. 19-20.

possible, has convinced the writer that interchange of knowledge among the *patrónes* and especially the younger members of their families as well as education of the Indian *colonos* is basic to agrarian and tenure reform on the *Altiplano*.

Land Tenure in the Montanas

The principal areas of agricultural settlement in the *Montanas* are in subtropical Nor Yungas a short distance east of La Paz but separated from it by a mountainous divide and in the valleys of the Departments of Cochabamba and Tarija.

Land Tenure in Nor Yungas. The agrarian history of Nor Yungas is as complex as it is interesting, and therefore would require an entire article to do it justice. It is the region which produces in its narrow valleys and on its mountain sides the coca leaf so highly prized for chewing by the Indians of the Andes regions. The *hacienda* system predominates and the *patrónes* are well organized. Here the Yungas Indian is the laborer. His dress and habits are different and his relations to his *patrón* who is likely to be a resident of La Paz present important variations from those of the *Altiplano haciendas*. Here also some progress has been made in the communal settlement of Jewish refugees in the Socob project financed by the tin magnate Hoeschchild. Malaria and even more malignant diseases have prevented greater achievements in the exploitation of this region.

Land Tenure in the Cochabamba Valleys. The Cochabamba region is comprised of a group of small flat valleys surrounded by a larger proportion of the area consisting of rugged semi-barren mountains. Situated at an intermediate altitude between that of the *Altiplano* and the *Oriente*, its climate is ideal for human health and enjoyment and is adapted to a wide variety of crops. The modern city of

Cochabamba, already mentioned, is one of the most attractive of the country. As on the *Altiplano* the labor force in agriculture are Indians. In Cochabamba the Indian laborers speak Quechua, the language of the Incas.

The *haciendas* of the Cochabamba area are organized much the same as are those of the *Altiplano*. A brief description of one of them will suffice to supplement the foregoing more general discussion of the *Altiplano haciendas*. This typical *hacienda* is reached by a one-half day horseback ride from Morochata which is on a highway 40 kilometers northwest from Cochabamba. Two rivers, Pilatos and Ckoraya, form its eastern and southern boundaries respectively. On the north and northwest the indefinite limits are roughly indicated by high mountains. On the west a ditch has been dug to mark the boundary between it and an adjoining property.

About the center of the *hacienda* is the home of the *patrón* (*casa de hacienda*) and the church. In the north central part are the fields of the *patrón* farmed under irrigation in a rotation of wheat, barley, corn, and potatoes. Oca, a kind of potato, is also grown. These crops are in a very good state of cultivation. About ten per cent of the *hacienda* is cultivated.

In the north central part are the scattered huts and *charcaras* of the 80 (more or less) *colonos*, who perform the labors on their own land and contribute three days a week of work on that of the *patrón*. Each family head is more or less permanently associated with the land which he cultivates in rotation with pasture. If the *colono* feels that he needs more or different land he appeals to the *patrón* who usually concedes to his wishes for land is plentiful. Water for irrigation, however, is scarce and is rotated among the renters, the *colonos*, and the *patrón* who is the arbiter in the

matter when present. When the *patrón* is absent, which is much of the time, the *administrador* becomes the business manager reporting each week by letter to the *patrón*. Under him is the *mayordomo*, half breed, general foreman of field work. He directs the *hilicatas*, field foremen, in their respective sections of the *hacienda* of which there are several. The *hilicata* is elected by the *colonos*. Being a canton as well as a *hacienda* the community has an *alcalde* representing the police power of the government. For minor offences pertaining to the work of the *hacienda*, however, the *administrador* is the disciplinarian and in case of gross laziness or dishonesty applies the whip.

South of the huts and *charcaras* of the *colonos* are the lowlands (*bajios*) along the Río Pilatos. These lowlands are rented at a very low rent paid in cash, because although they are very productive they are in a malaria belt and there is some sickness. Fosses are also a problem. Here are grown the *chirimoya*, a delicious subtropical fruit, tomatoes, *aji*, a red pepper, and *lecoto*, also a kind of pepper.

The rent agreement, like that in other nearby areas, is for a term usually of five or six years but sometimes eight or even fifteen. The *patrón* on this *hacienda* provides the seed. Some of these renters have accumulated small fortunes.

The Quechua-speaking *colonos* on this *hacienda* have caused much trouble and are said by a member of the family of the *patrón* who has managed the estate to be with a few exceptions very mean, dishonest, lazy, uncooperative and dangerous. There have been recent uprisings resulting in bloodshed. Thus the problem of education and reform, as on the *Altiplano*, is an urgent and unsolved problem.

In many of the other small valleys of Cochabamba the proprietors turn small

parcels of land over to the Indian cultivators with whom they enter into a kind of partnership or cropper arrangement (*sistema de la aparaceria*). The landowner supplies the land, half the seed and pays part of the water if there is an irrigation charge. In exchange the cultivator-partner (*campesino-companero*) supplies the balance of the seed and the labor from the preparation of the land to the transportation of the products to market inclusive. Half the products plus certain personal services are the landowners' share.

Another form of exploiting the farm lands of Cochabamba are on the basis of loans made by the landowners to the Indian cultivator (*prendatario*) who pays at least 12 per cent interest on his loan.

On the whole, the larger valleys of Cochabamba are subject to extreme fragmentation of ownerships and operating units. Cochabamba is said to have 98,000 landed properties and 180,000 proprietors.⁴²

Land Tenure in Tarija. Land tenure in Tarija is important because it represents a Bolivian variation from the *Altiplano hacienda* system, a variation which is widespread in other parts of South America, particularly Brazil and Argentina. The system in Tarija and on the *Altiplano* together present in their broader outlines the two types of agrarian organization that characterized those of primitive Germany, the later Roman Empire and Gothic Spain during the first few centuries of the Christian Era. Because of the interaction of German and Roman influences, prior to the Gothic regime in Spain, as indicated in an earlier article,⁴³ it is hazardous to attribute German or Roman origin specifically to either one of these types. If a conjecture were to be made, however, it is possible that German influence had a stronger representation in

⁴² Saavedra, *ibid.*, p. 13.

⁴³ Weeks, *ibid.*, European Antecedents, etc. pp. 74-75.

the *Altiplano* system and Roman in that of Tarija.

Following the age-old custom of southern Iuope, which attributes a certain amount of prestige and dignity to the production of livestock, the landed proprietor is inclined to specialize, though this is not invariable in this phase of production, renting out lands to be used for tilled crops.

Rents are paid, not by rendering personal services as on the *Altiplano* but in cash or, less frequently, a share of the crops specified for each subregion by an official government body (*Junta Agropecuaria Departamental*). Or, the cropper or partnership system practiced in the Cochabamba region also may be found in which case the crop is divided between landowner and cultivator on a fifty per cent basis. The lands reserved by the landowner for his own farming operations are operated by the use of hired labor for which a cash wage is paid. The agricultural laborers may or may not have their homes on the lands of the landowner, and may or may not be the renters mentioned above. Agricultural laborers received in this area in 1943 the equivalent of less than \$0.50 United States currency for a day of eight hours. Absentee landlordism, as in other parts of the country, is the rule rather than an exception.

Land Tenure in the Oriente

The *Oriente*, agricultural frontier of Bolivia,⁴⁴ embraces the public land states. Floods, savage Indians, lack of transportation, and in some parts unhealthy conditions have retarded the development of its millions of hectares of productive but wild lands (*baldíos*), and

other millions of hectares of land concessions, also wild or only partially improved and in a doubtful status of compliance with the conditions under which they were granted.

Disposal of Public Lands and the Consequent Tenure Pattern. A supreme circular of 1838 made a distinction between wild lands (*baldíos*) and excess community land of the *Altiplano* (*sobrantes*).⁴⁵ In 1912 a resolution defined *baldíos* as lands which do not have any signs of survey or boundary markings.⁴⁶ Thus two kinds of state lands were recognized while their disposal and administration was governed by separate procedures. In 1938 excess lands which had reverted to the state, together with *baldíos*, were designated as "disposable national properties."⁴⁷

In 1945, according to the national register, about 90 per cent of the area of land concessions registered up to that time pertained to the *Oriente*. The remaining 10 per cent pertained to the *montañas*. None had been registered from the *Altiplano*⁴⁸ where the excess community lands (*sobrantes*) for the most part have passed into private ownership by other procedures and where the remaining public lands are rugged mountains or saline plains both unsuited for agriculture, forest products or grazing. Thus the public land problem is a problem of the *Oriente* and with transportation it is the central problem of the *Oriente*.

Concessions did not begin on a large scale in Bolivia until 1851.⁴⁹ Between that date and 1905 numerous individual concessions had been made by special acts of Congress. A few attempts were made during this period to draft general laws defining procedures, the most notable of which were those of 1886⁵⁰ and

⁴⁴ David Weeks, "Bolivia's Agricultural Frontier," *The Geographical Review*, 1946, pp. 546-567.

⁴⁵ J. Lavadenz, *La Colonización en Bolivia* (La Paz, Bolivia, Talleres Gráficos de la Intendencia de Guerra, 1925), p. 3.

⁴⁶ Araoz, Tomo III, p. 294.

⁴⁷ Araoz, Tomo V, p. 120.

⁴⁸ Percentages calculated by the writer from unpublished data of the Gobierto Topográfico. See footnote 4.

⁴⁹ Lavadenz, p. 5.

⁵⁰ Lavadenz, pp. 12 and 13.

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1895.⁵¹ All of the earlier laws, however, have been superseded by the general law of 1905,⁵² a decree of 1907⁵³ regulatory thereto and numerous amendments to these. This general law with its amendments, in addition to defining procedures for obtaining new concessions, has provided for the consolidation of holdings and the adjudication and registration of titles of concessions acquired under the various earlier laws, or by prescription where the public domain has been occupied without formal petition.

Public lands in general have been sold to concessioners. In 1945, of the 24,592,322 hectares represented by registered titles of concession, 87 per cent had been alienated at a specified price per hectare. The remaining 13 per cent had been alienated in the form of free grants, rewards for service of some kind, or compensations under special contract.⁵⁴

Prices per hectare for consolidating public land have rarely exceeded one boliviano and most frequently have been specified at 10 centavos. Most of the great rubber land concessions were disposed of at an average of about 20 centavos per hectare, but the price prior to 1905 varied, depending upon the density of the stand of rubber trees. The value of the boliviano has varied greatly. Since 1936 when the price for consolidating public lands was fixed at one boliviano per hectare,⁵⁵ and 1941 when that price was again confirmed, ⁵⁶ the value of the boliviano has depreciated to a legal exchange rate of 42 bolivianos to one United States dollar, and a black market rate of more than 50. Conversion of these prices in bolivianos per hectare to United States cents per acre give ridiculously low figures for the price of land.

⁵¹ Araoz, Tomo III. pp 314-325.

⁵² Araoz, Tomo III. pp. 292-295.

⁵³ Araoz, Tomo III. pp. 295-304.

⁵⁴ Percentages calculated by the writer from data described in footnote 1.

⁵⁵ Araoz, Tomo V. p. 119.

Sizes of concessions have been prodigious. The law of 1886 had been reasonable in regard to size of concession providing for three lots of 25 hectares each, one to the head of the family and one to each son over 14 years of age. The law of 1895, however, had a permanent effect upon the tenure pattern of the *Oriente*. In 1936 the concessions of 20 families amounted to 13,520,650 hectares (33,400,000 acres), a third of the area of California. One family held 5,102,114 hectares.⁵⁷ In 1945, 117 rubber concessions averaged 105,700 hectares each. Livestock concessions, 445 in number, averaged 3,840 hectares, and 1905 agricultural concessions averaged 5,500 hectares.⁵⁸ Many of course were greater in size than the average.

The law of 1905 permitted concessions up to 20,000 hectares (49,420 acres) in size, but it did not limit the number of separate petitions under which titles could be adjudicated to one person. In 1915, sales of public lands were discontinued except by special act of Congress, but consolidations under earlier laws and by those occupying the public domain without petition continued.⁵⁹ In 1937, provision was made to consolidate holdings up to 2,500 hectares, and where improvements made by the concessioner justified such an extension, 5,000 hectares were permitted.⁶⁰ In 1941, the right to consolidate concessions made prior to 1915, according to the prescriptions in force, was reopened while those holding public lands involving rights later than 1915 who could prove possessions for a period of 10 years or more, could perfect their titles to 2,500 hectares.⁶¹

⁵⁶ Araoz, Tomo V. p. 122.

⁵⁷ Roca R. Edgar, Unpublished report to the writer, August 1944.

⁵⁸ Averages calculated by the writer from data described in footnote 1.

⁵⁹ Araoz, Tomo III. p. 325.

⁶⁰ Araoz, Tomo V. p. 121.

⁶¹ Araoz, Tomo V. p. 122.

A supreme circular in 1942 called attention to irregularities in the procedure of consolidating public lands and to general disregard for the laws pertaining thereto. It also provided rules to be followed in obtaining title to public lands. Among these rules of procedure were detailed provisions for survey and marking of property boundaries.⁶² Such provision had been included in many of the earlier laws but without adequate appropriations for carrying them into effect.

Intimate official experience by the writer in the Department of Santa Cruz as late as 1944 makes it possible to state that in a majority of cases surveys are either nonexistent or are so inaccurate that, notwithstanding an orderly system of registration, the status of land titles on the ground is in a deplorably chaotic condition. Properties overlap. A map of any local area showing property boundaries cannot be made from available records. Property owners, whether individuals or the national government itself, do not know how much land they have nor where it is located in relation to other properties. Only in the Department of Pando has there been a well-ordered land survey.

It is natural that under these frontier conditions an adjustment to the confused situation has been made using laws inherited from ancient and medieval Europe where similar or worse conditions had prevailed as a result of warfare. In general, peaceful possession of any property for a period of thirty years will give title to the possessor by the Bolivian laws of prescription. As stated previously, however, only ten years' possession is required to acquire similar title to public lands. Such procedures have been the rule and it appears that they have provided a means for the intelligent and in-

formed to gain title to land at the expense of the ignorant. From colonial times such an advantage has made accurate surveys unpopular in other South American countries. It is possible that land surveys are unpopular today in Bolivia for the same reason. It can be said with certainty that Bolivia has been unwilling or unable to provide funds for accurate land surveys. Thus, vast undeveloped properties vaguely located and delineated characterize a large part of the *Oriente*.

The Agrarian Pattern of the Oriente. In clusters here and there which dwindle in size to mere spots of clearing in the vast forest beyond the frontier a distinctive agrarian pattern has been established in parts of the *Oriente*, the *hacienda* and cattle *estancia* predominating. Unlike the *hacienda* of the *Altiplano*, labor is hired by the day or by contract. If the latter, the contract is based upon an estimate of a day's work and may or may not be arranged through an intermediary who does the hiring and supervision. Rental contracts are less frequent than in the other regions. Daily wages in 1944 were 14 bolivianos (33 cents U.S.) and food, or 24 bolivianos (57 cents U.S.) without food.

Many of the homes of the proprietors or administrators are of the characteristic quadrangle type contiguous with various types of storehouses and shops around an enclosed patio, but this arrangement is not invariable. In the same headquarters group, or at some distance from it, is the primitive sugar-making equipment or alcohol still. Servants in the proprietors' homes are hired.

In contrast with the house of the proprietor are the clusters of laborers' huts of stocks and clay, or wattle. Unlike the *Altiplano*, residence as well as marriages are more or less temporary, the latter being at times quite informal.

⁶² Araoz, Tomo V. p. 122.

The livestock *estancia* differs from the *hacienda* only in the amount of emphasis on livestock, usually being self-sufficient in respect to food production even to coffee and sugar. There are many migratory herds in the *Oriente*, some from pasture to pasture as feed conditions change, some of them making long treks of eight to fifteen days from the areas in which they are produced to those from which they are taken to market or butchered for home use. There are no beef-fattening enterprises in the *Oriente* however.

The scale of farming and processing varies from those employing a hundred or more laborers to the family-sized holding of the individual who performs his own labor. Near the cities of the *Oriente*, and there are such, laborers and small holders talk the Spanish language and refrain from bowing down to their superiors in wealth as do the Indians of the *Altiplano*. In more remote areas, however, a direct account has been related to the writer by at least one proprietor who has subjected wild savages to labor under the lash. Conversion is done legally, however, only in the missions where as neophytes the savages learn the ways of the white man and eventually become independent laborers or even landowners. In many parts of the *Oriente* the Guaraní Indian language is the only one spoken.

The plane of living of the small holders of the *Oriente* is highly variable. Some are partially educated and live on a standard comparable with that of the proprietors of the larger-scale *haciendas*. Others are as near the bare subsistence level as can be imagined, and may find shelter under a flimsy palm-leaf roof with or without side walls and food from hunting and a small patch of mandioca. Many of the latter type are squatters on the public domain or on lands of other proprietors to which eventually they may

obtain title by prescription. Far from other settlements, individually or in clusters, these squatters form a definite part of the agrarian pattern.

Brief mention should be made finally of a very important subject in the *Oriente* requiring a full article by itself commensurate with that importance. This is the matter of colonization. Colonization in Bolivia has had a long, hard and, in general, unsuccessful history. Lack of success has been due primarily to unsatisfactory land titles, lack of surveys, and to the remoteness and unhealthfulness of the locations selected for the colonies. Financial assistance and exception from duties and taxes have been extended, but for the most part without results. From the standpoint of the present discussion of land tenure it is interesting to note that in general the colonies established in Bolivia are of the urban-rural type in which a town lot and an agricultural allotment is assigned to each colonist on the basis of performance in improving the same. These allotments remain inalienable until after title is perfected. Prices of land have been very low or gratuitous. The potentialities of colonization in the *Oriente* in the future will be greatly enhanced by highway and railway penetration now taking place from the west and from the east, respectively.

Conclusions

In conclusion of this last article of a series of three on land tenures in Bolivia and their antecedents, the most significant and most useful of all the many other observations which might be made in retrospect is to call attention to the outstanding failure of the landed proprietors of Bolivia, as well as those of other countries and earlier periods, to recognize their opportunity and duty, in their own interests and those of their country, to

take a more active part in the management of their estates. There are many directions in which such increased activity might take place, some of which might be suggested as follows:

(1) A program of adult education might be inaugurated among the leading *patrónes* of the country through group discussions, fairs, demonstrations, libraries, and economic studies of their own *haciendas*.

(2) Discussion groups also might be inaugurated among the *patrónes* on land-tenure reform as it has taken place throughout the world, making a special study of the English land-tenure system in contrast with those of central Europe and Mexico.

(3) It might be worthwhile to consider the possibility of selecting a few of the best workers and the more cooperative among their *colonos*, placing these upon the best lands under improved conditions of tenancy with a greater share in the proceeds as an incentive to greater productivity. In the meantime, the balance of the *hacienda* could be worked as usual.

(4) The supply of necessary working knowledge, implements, seeds, improved livestock, improved living quarters, and encouragement to these tenants may be considered the productive contribution of the *patrón* so that returns may be increased for landlord and

tenant alike, and at the same time a greater national income provided.

(5) The intellectual and moral education of the children of the *colonos*, with special emphasis upon raising their standards of living, is already a legal responsibility of the *patrónes*. Enforcement is in their own hands.

The above suggestions assume the maintenance of an economy based upon private enterprise. If a socialistic regime should be ushered in by popular vote or revolution then the plan mentioned earlier, which was proposed by Mr. Saavedra, has an advantage in that it gives both *patrón* and *colono* an opportunity to participate. Education and general enlightenment remains as important as before, and many of the same suggestions would apply.

A third alternative, already mentioned, is a revolution that would dispossess the *patrónes* and place the lands in the hands of those that work them. Such a catastrophe is certain to follow if the *patrón* cannot demonstrate his usefulness to society. But first it is necessary for him to be able to visualize the importance to his country of a virile rural life.

Reports and Comments

The Demand for Electricity

FROM time to time attempts are made to derive demand curves for electricity, and to determine demand elasticities.¹ In examining the possibilities for progress along these lines, the present paper will be concerned with the following topics: (1) the isolation of demand conditions (with reference to two outstanding studies of demand conditions); (2) the general description of demand conditions when block rates are used; (3) the significance of demand elasticities when block rates are used; and (4) an example of consumption change following a rate change.

Consider first a time-series study of demand conditions described by G. C. Delvaille.² For an individual utility Mr. Delvaille fits the equation (1) $Y = K^X$, where Y is the annual kilowatt-hour sales per residential customer over the period 1930 to 1941, K is a constant, and X is the average rate per kilowatt-hour. It appears that, when K is appropriately varied, this equation gives a good fit for each of several utilities, and for the United States.

As the title of his article suggests, Mr. Delvaille is interested in information that can be used in determining rate policy. Concerning a graph drawn for equation (1), he writes, "This same method will indicate whether . . . a reduction will decrease the per customer revenue as a by-product of increasing the kilowatt-hour sales."³

¹ Demand will be thought of as indicating a consumer's disposition to buy. Thus a consumer's demand for a good at a single price p is the quantity he will buy if p is the actual price.

² G. C. Delvaille, "Can Rate Change Results be Precisely Predicted?" *Public Utilities Fortnightly*, April 11, 1946, p. 465. Mr. Delvaille seems to have omitted a constant from his equation. To get the kind of downsloping curve he shows, the right side of the equation should be L/K^X , where L is a second constant.

³ *Ibid.*, p. 476.

⁴ *Ibid.*, p. 469.

⁵ Howard A. Cutler, "The Elasticity of the Residential Demand for Electricity," *Journal of Land & Public Utility Economics* 242, May 1941.

⁶ It is difficult to be sure exactly what procedure Mr. Cutler has used. He refers to a "direct least-squares method" and mentions Professor Henry Schultz's book, *Statistical Laws of Supply and Demand* (Howard A. Cutler,

Mr. Delvaille mentions the fact that the historical increase in consumption was due partly to an intensification of demand and partly to rate reductions.⁴ But this fact is not taken into account in equation (1). If both rate schedule and demand conditions change, an equation that fails to include any indicator of the strength of demand must fail to show the relation between rates and consumption.

Howard A. Cutler has used a related procedure. He has dealt with many utilities at the same time, instead of dealing with the same utility at different times.⁵ The fundamental defect of this procedure is similar to that just mentioned. Demand conditions will vary among the specific cities.⁶ One ought to introduce into the analysis some indicator of the income of the communities; for instance, rent per dwelling or rent per person could be calculated from the 1940 Census of Housing.

Thus neither Mr. Delvaille nor Mr. Cutler attempts to isolate demand conditions; their results are joint effects of demand changes and supply changes. Such results have no significance for predicting the effects of rate changes.

But suppose that demand conditions remain unchanged for a long period, while block rates are used; how can the demand conditions be described? Particularly, is

op. cit., p. 243). In response to criticism he states that the direct least-squares method takes account of the fact that both price and quantity are subject to errors. (Howard A. Cutler, "Elasticity of Residential Demand for Electricity: A Rejoinder," *Journal of Land & Public Utility Economics*, November 1941, p. 501.) On page 38 of *Statistical Laws of Supply and Demand*, (Chicago: University of Chicago Press, 1928) Professor Schultz described a least-squares procedure for the case in which there are errors in both price and quantity. He did not deal with cases in which many price-quantity observations were made at the same time for several geographic areas, and Mr. Cutler's explanation and defense of his own method contain no reference to any attempt to deal with the effect of geographical variation in income. Parenthetically, when a regression line is fitted on the assumption that both quantities are subject to error it is necessary to set up a system of relative weights for errors in the two directions; Mr. Cutler has given no information about his choice of weights.

there anything that can be called a demand curve?⁷

Consider this question for an individual buyer. As it is ordinarily defined, the demand curve of an individual for a given commodity shows for each price the quantity he will take if that price is charged for all units sold at a given time and place. If a block rate is used, there is no one price at which all units are to be sold.

It may be suggested that "price" ought to mean the average price for an individual's consumption. Will this interpretation make possible the use of a two-dimensional demand curve?

If no conditions are attached, the question "how much will you buy at an average price of 3c per kwh?" implies that the average price is independent of the amount taken. But this cannot be intended when a block rate is used.

If the average price is to be 3c per kwh only on condition that the buyer take exactly 100 kwh, the only possible question relating to the 3-cent price is "will you buy exactly 100 kwh at 3c per kwh?" If the answer is no, no point is plotted. Thus the "demand curve" must contain only one point: the point indicating actual consumption under the actual rate schedule. Such a diagram can give no information about the consequences of rate changes.

To get meaningful conditional answers, one must specify all the conditions. If a diagram is planned when block rates are used, there must be four axes. The "independent" axes will show the price of the first block, the size of the first block, and the price of the excess. The "dependent" axis will show consumption. There is no way to simplify this scheme and still portray demand conditions under a block rate.

Consequently, only "partial" demand relations can be shown on two-dimensional diagrams. For instance, it is possible to show how an individual's consumption varies when only the size of the first block varies, the two prices remaining constant. A complete representation of demand conditions requires schedules or formulas.

Each individual's demand function permits the prediction of his consumption when the elements of the block rate are specified. The aggregate consumption of a group can be

obtained by adding all individuals' consumptions for each combination of elements of the block rate. If the utility's cost function is known, the aggregate demand function is useful in determining the cost associated with a given rate schedule.

In the case of a one-price good, elasticity of demand is useful principally because it indirectly provides information about the revenue effect of a small reduction in price. Can elasticity of demand perform a similar service when a block rate is used?

Consider first the situation of the individual buyer when block rates are used. The seller can change either the price of the first block, the size of the first block, or the price of the excess. Accordingly, it is desirable to have some shorthand to describe the result of each possible change. For instance, the statement "marginal revenue is positive with respect to the size of the first block" might be conventionally accepted as meaning that some small reduction in the size of the first block would increase the individual's spending if the two prices remained constant. Similar statements might be made for each of the two other elements of the block rate.

But there is an objection to speaking of partial elasticities. To conform with common usage, elasticity would have to be defined as the percentage change in the individual's spending divided by the percentage change in the size of the first block, for instance. In the case of a one-price good, there is the formula:

$$(2) \quad MR = p \left[1 + \frac{1}{e} \right],$$

where MR is marginal revenue, p is price, and e is elasticity. Marginal revenue is positive as long as the absolute value of e is greater than one. But in the block-rate case there is no comparable formula for any element. It is not possible to determine the sign of any partial marginal revenue from the size of the corresponding elasticity. Therefore, it is not appropriate to use elasticities in describing the elements' revenue effects.

Consider next the demand conditions of a group of consumers. For any element of the block rate, adding the partial marginal revenue figures for the individuals will give an aggregate marginal revenue. But it is not possible to use the aggregate demand surface in arriving at this result. In the case of the individual, it is possible to determine revenue

⁷ In Sections II and III it will be assumed for simplicity that there are only two consumption blocks. The actual block rates dealt with in Section IV are more complicated.

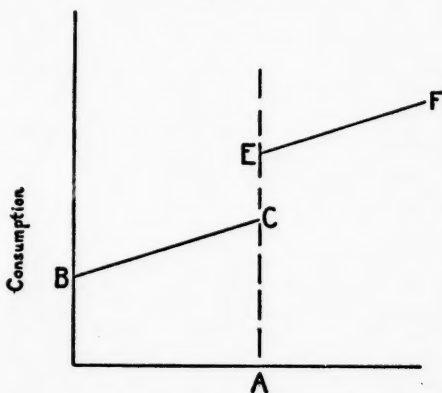
from consumption, given the rate schedule. But this is not true for aggregate consumption. Suppose that there are two customers, each using 100 kwh per month, and that 100 kwh per month is the size of the first block. Let one customer buy 5 kwh per month more, and the other 5 kwh per month less. The new situation will yield less revenue than the old, since the kwh added by the first customer are relatively cheap, and the kwh given up by the second customer are relatively expensive.

From a revenue standpoint there is no reason to deal with aggregate consumption. All information relating to revenue must be taken from the demand surfaces of the individuals.

Since it is not possible to determine revenue from aggregate consumption, it is not possible to determine marginal revenue from the effect of any rate element on aggregate consumption. Therefore, there is no use for aggregate elasticities.

When actual results are dealt with there is still the problem of allowing for the effect of changes in demand conditions. One possible procedure is the following: Suppose that the seller has data for the average consumption per meter, with seasonal influence removed by some device such as link relatives. In Chart I, let A be the time at which the

CHART I



rate change goes into effect. Let a trend line be drawn extending from the beginning of the series to the ordinate AE. Let another trend line be drawn, beginning at the ordinate AE, and extending forward a convenient distance. For the time A, there will be

two trend values, AC and AE. The relation between these two trend values may be considered an indication of the effect of the rate change.

For a given rate schedule the growth of consumption per meter shows the effect of changes in consumers' income. When the rate schedule is changed the income force still operates, but the consumption curve should be lifted to a higher level by the rate change. The distance between the "before" and "after" trend lines for the date of the rate change indicates the influence of the rate change.

The procedure involves two assumptions. The first is that if random factors are ignored the consumption function can be written in some form like:

$$(3) \quad c = f(r) \times g(t), \text{ or}$$

$$(4) \quad c = f(r) + g(t),$$

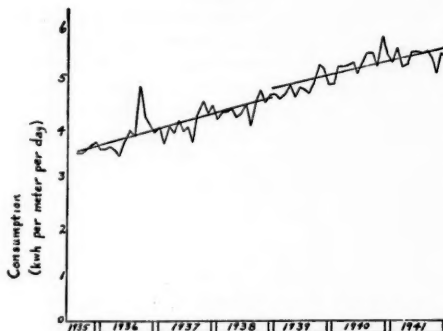
where c is consumption, r is the rate schedule, t is time, and $g(t)$ is a function indicating the influence of non-rate factors, such as consumers' income. The second assumption is that if $g(t)$ were plotted, the curve would have a "smooth" appearance; this would be true if $g(t)$ were a straight line or a sine curve, for instance. Actually there will be chance forces at work, so that the observed consumption for a given rate schedule will show sharp variations around its trend line.

This procedure has the effect of obscuring the time required to work out the effects of the rate change. Probably if the rate change does shift the trend upward, the first figures after the rate change will tend to be below the new trend line. It should also be noted that advance announcement of a rate change may cause an increase in consumption. For instance, buying a range may become desirable whenever there is a change in the anticipated cost of operation over the life of the range.

Chart II shows one plant's figures for combined residential and commercial consumption per meter for the period from August 1935 through December 1941. A rate schedule went into effect on August 1 1935; since trend lines are fitted, the figures are not shown after the month in which the United States entered World War II. Link relatives have been used to correct for seasonal variations. For this purpose all available months have been used, so that the seasonal

correction is based on figures from July 1935 through December 1946.

CHART II



From August 1, 1935 to March 1, 1939 the utility had the following lighting rate schedule:

	<i>Net Per Kwh. in Cents</i>
First 100 kwh or less used in one month.....	5.5
Next 100 kwh or less used in one month.....	4.4
Over 200 kwh used in one month.....	3.5

There was an optional residential rate schedule, in which the first 60 kwh per month cost \$3.50, and all excess kwh cost 2.5c per kwh. There was a cooking rate schedule available where single heating units of at least 2000 watt capacity were installed. Every use except lighting could be put on the cooking rate. The minimum was \$2.50, and the rate was 3c per kwh. There was an off-peak water heating rate, at 1.5c per kwh.

Beginning March 1, 1939, the utility has had the following lighting rate schedule:

	<i>Net Per Kwh. in Cents</i>
First 100 kwh or less used in one month.....	5.0
Next 100 kwh or less used in one month.....	4.0
Over 200 kwh used in one month.....	2.5

In the optional residential rate schedule, the cost of the first 60 kwh was reduced to \$3.00. The cooking rate was unchanged. The

water heating rate was reduced to 1c per kwh. The change was announced on December 30, 1939, about two months before it became effective. Power rates were unchanged; in any case, only residential and commercial consumption have been considered.

A least-squares straight line trend has been calculated for the months from August 1935 through February 1939. Another least-squares straight line trend has been calculated from March 1939 through December 1941. Each line has been extrapolated to the midpoint between the February and March ordinates. Thus two estimates can be identified with March 1, 1939. The two estimates are 4.614 kwh per meter per day and 4.786 kwh per meter per day. Thus the difference attributable to the rate change is 0.172 kwh per meter per day.

No trend lines more complicated than straight lines have been fitted since the straight lines seem to fit reasonably well. It is noticeable that the two lines are nearly parallel. Thus the present case seems to be a relatively easy one with which to deal.

It may be objected that the consumption increase attributable to the rate change depends on the time of the rate change. This is true, unless equation (4) is realized. But no method can escape from this difficulty when rate changes are infrequent. If there are many rate changes it ought to be possible to interpolate for the effects of rate changes at intervening times. In that case the present method would not be appropriate, since the duration of each rate schedule would not be sufficient to permit trend-fitting.

In any case it is important to remember that it is improper to identify a change of average price with a change of the rate schedule.

Summary

(1) If there is to be an attempt to determine the extent to which a rate change affects consumption there must be some means of eliminating the effect of changes in consumers' income. A method for doing so has been suggested.

(2) When a block rate is used a representation of demand conditions for either an individual or a group must show the quantity bought as dependent on each of the elements of the block rate. A knowledge of demand conditions is useful in predicting the cost changes due to a rate change.

(3) When a block rate is used it is possible to define an individual's partial marginal revenue with respect to each of the elements of the rate. However, partial demand elasticities are useless in revenue computations.

(4) When a block rate is used aggregate demand under a given rate schedule is not worth working with, from the standpoint of

revenue. All computations must be made for the demand conditions of the individuals. A fortiori, aggregate partial demand elasticities are useless in revenue computations.

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Public Utility Financing in the Second Quarter of 1947

IN the second quarter of 1947 there were offerings of public utility securities of approximately \$900 millions. This total is double the amount of public utility securities offered in the first quarter of 1947. Over one-half of the total offerings for the quarter were offered in June.

Table I gives a summary and analysis of public utility long-term debt issues offered publicly during the second quarter of 1947. The \$200 million American Telephone & Telegraph Company 2½% debentures of 1987 offered in June at 102.875% of par to yield 2.76% was the largest issue offered

TABLE I—SUMMARY AND ANALYSIS OF PUBLIC UTILITY LONG-TERM DEBT ISSUES OFFERED PUBLICLY, SECOND QUARTER, 1947

Company and Issue (A)	Coupon Rate (B)	Principal Amount (C)	Ma- turity Date (D)	Month of Offering (E)	Offering Price (F)	Offer- ing Yield (G)	Under- writers' Com- missions (H)	Pro- ceeds to Com- pany (I)	Esti- mated Incidental Expenses (J)	Net Pro- ceeds (K)	Cost to Com- pany (L)
	%	\$			%	%	%	%	%	%	%
Michigan Gas & Electric Co. First Mortgage	2-¾	3,500,000	1976	April	101.45	2.80	.931	100.519	.78	99.739	2.89
Northern States Power Company (Wia.) First Mortgage	2-¾	19,000,000	1977	April	101.25	2.57	.569	100.681	.71	99.971	2.62
Consolidated Edison Co. of N. Y., Inc. First and Refunding Mortgage	2-¾	100,000,000	1977	May	101.05	2.60	.320	100.720	a	a	a
Consolidated Gas, Electric Light & Power Company of Baltimore Convertible Debentures	2-¾	16,677,100	1962	May	100.00	2.50	a	a	a	a	a
New England Electric System Debentures	3	25,000,000	1967	May	101.50	2.90	.911	100.589	a	a	a
New England Electric System Debentures	3-¼	50,000,000	1977	May	102.91	3.10	1.081	101.89	.56	101.289	3.10
South Carolina Power Company First Mortgage	3	4,000,000	1977	May	103.00	2.85	.81	102.10	a	a	a
Southern California Water Company First Mortgage	2-¾	5,100,000	1977	May	102.75	2.74	.67	102.08	a	a	a
American Telephone & Telegraph Co. Debentures	2-¾	200,000,000	1987	June	102.875	2.76	.655	102.2199	a	a	a
Consolidated Edison Co. of N. Y., Inc. First and Refunding Mortgage	2-¾	60,000,000	1972	June	102.00	2.64	.574	101.426	a	a	a
Kentucky Utilities Company First Mortgage	3	24,000,000	1977	June	101.985	2.90	.776	101.217	.42	100.789	2.96
Michigan Consolidated Gas Company First Mortgage	2-¾	6,000,000	1969	June	102.05	2.75	.781	101.269	a	a	a
Mississippi Power & Light Company First Mortgage	2-¾	4,500,000	1977	June	101.125	2.81	.836	100.289	.91	99.377	2.91
Public Service Company of Colorado First Mortgage	2-¾	40,000,000	1977	June	103.25	2.71	.540	102.71	.53	102.18	2.77
Public Service Co. of N. Hampshire First Mortgage	2-¾	4,500,000	1977	June	101.915	2.65	.424	101.49	a	a	a
Southern Bell Telephone & Teleg. Co. Debentures	2-¾	75,000,000	1987	June	102.80	2.76	.40	102.40	a	a	a
Southern California Gas Company First Mortgage	2-¾	12,000,000	1977	June	104.213	2.66	.675	103.538	.66	102.878	2.73
Toledo Edison Company First Mortgage	2-¾	32,000,000	1977	June	103.1947	2.71	.576	102.589	a	a	a
Upper Peninsula Power Company First Mortgage	3-¼	3,500,000	1977	June	102.875	3.10	1.875	101.00	a	a	a
TOTAL OR WEIGHTED AVERAGE..		688,777,100			102.34	2.74	.61b	101.76b	.58b	99.93b	2.92b

a Information not available.

b Exclusive of issues for which information is not available.

during the quarter. The second largest issue offered was the \$100 million Consolidated Edison Company of New York, Inc. 2½'s of 1977 offered in May at 101.05% of par to yield 2.60%. Another large issue was the \$75 million Southern Bell Telephone and Telegraph Company 2½% debentures of 1987 offered in June at 102.80% of par to yield 2.76%. There were nineteen publicly-offered, long-term debt issues totaling \$688.7 millions offered in the second quarter of 1947.

The lowest offering yield of 2.50% was recorded for the Consolidated Gas, Electric Light and Power Company of Baltimore 2½'s of 1962 offered in May at 100.00% of par. Of the issues for which information is available, the Northern States Power Company (Wisconsin) 2½'s of 1977 offered in April at 101.25% of par to yield 2.57% had the lowest cost to company of 2.62%.

The weighted average offering yield was 2.74% which is an increase over the 2.65% weighted average for the first quarter of 1947. The weighted average underwriters' commission was .61% and, for estimated incidental expenses, .58%. The weighted average cost to company for those issues for which information is available was 2.92%.

Table II gives a summary and analysis of public utility long-term debt issues offered privately in the second quarter of 1947. There were twelve issues totaling \$11.7 millions offered privately in the second quarter. This total is a marked decrease from the \$50 million private offerings for the first quarter. All of the issues in the second quarter were small; the \$2.5 million Western Natural Gas Company 3¼'s of 1962 offered in June was the largest issue.

Preferred stock issues offered during the second quarter are analyzed in Table III. Fifteen issues totaling \$152.6 millions of preferred stock were offered in the second quarter. The \$41.3 million Southern California Edison Company par \$25 offered in May at \$29.25 to yield 3.82% was the largest issue; this same company had another large issue of \$36.2 millions, \$25 par, offered at \$28.75 to yield 3.75%. The weighted average offering yield for the fifteen issues was 3.86% which is at approximately the same level as the first quarter.

Table IV gives a summary of the public utility common stock issues offered during the second quarter of 1947. Nine issues offered during the quarter totaled \$36.4 millions

TABLE II—SUMMARY AND ANALYSIS OF PUBLIC UTILITY LONG-TERM DEBT ISSUE OFFERED PRIVATELY, SECOND QUARTER, 1947

Company and Issue (A)	Coupon Rate (B)	Principal Amount (C)	Maturity Date (D)	Monthly Offering (E)	Offering Price (F)	Offering Yield (G)
	%	\$			%	%
Community Public Service Company						
First Mortgage.....	3	850,000	1969	April	a	a
Missouri Utilities Company						
First Mortgage.....	2-¾	400,000	1971	April	a	a
Orange County (N. Y.) Telephone Co.						
First Mortgage.....	3	300,000	1977	April	a	a
Battle Creek Gas Company						
First Mortgage.....	3	1,200,000	a	May	100.00	3.00
East Coast Electric Company						
First Mortgage.....	3-¾	500,000	1977	May	102.051	3.01
Eastern Kansas Utilities, Inc.						
First Mortgage.....	2-¾	600,000	1967	May	100.00	2.875
Nashville Gas & Heating Company						
First Mortgage.....	3-¾	750,000	1966	May	a	a
Southeastern Telephone Company						
First Mortgage.....	5	950,000	1977	May	a	a
Virginia Telephone & Telegraph Co.						
First Mortgage.....	3-¾	1,250,000	1974	May	a	a
Western Natural Gas Company						
First Mortgage.....	3-¾	2,250,000	1962	June	a	a
Western Natural Gas Company						
Convertible Dbentures.....	4-¾	1,500,000	1957	June	a	a
Wichita Water Company						
First Mortgage.....	2-¾	950,000	1977	June	a	a
TOTAL.....		11,750,000				

a Information not available.

TABLE III—SUMMARY AND ANALYSIS OF PUBLIC UTILITY PREFERRED STOCK ISSUES OFFERED, SECOND QUARTER, 1947

Company and Issue (A)	Dividend (B)	Principal Amount (C)	Monthly Offering (D)	Offering Price (E)	Offering Yield (F)
	%	\$		\$	
New Jersey Water Company No Par.....	4.25	297,950	April	101.00	4.21
Connecticut Light & Power Co. No Par.....	1.90	8,523,424	April	52.00	3.65
Connecticut Light & Power Co. No Par.....	2.00	17,980,708	April	53.50	3.85
Michigan Gas & Electric Co. \$100 Par.....	4.40	1,400,000	April	101.00	4.35
New England Gas & Electric Assn. \$100 Par.....	4.50	7,762,500	April	103.00	4.37
South Atlantic Gas Company \$100 Par.....	5.00	100,000	April	102.00	4.90
Southern California Edison Co. \$25 Par.....	4.48	41,335,725	May	29.25	3.82
Southern California Edison Co. \$25 Par.....	4.32	36,246,225	May	28.75	3.75
Central Arizona Light & Power Co. \$25 Par.....	\$1.10	3,875,000	June	27.50	4.00
Dayton Power & Light Company \$100 Par, Series B.....	3.75	7,500,000	June	102.00	3.68
Dayton Power & Light Company \$100 Par, Series A.....	3.75	10,000,000	June	101.50	3.69
Kansas-Nebraska Natural Gas Co. No Par.....	5.00	530,000	June	106.00	4.72
Toledo Edison Company \$100 Par.....	4.25	16,000,000	June	103.625	4.11
Upper Peninsula Power Company \$100 Par.....	5.25	1,000,000	June	104.00	5.05
Western Kentucky Gas Company \$25 Par.....	4.80	117,000	June	27.00	4.44
TOTAL OR WEIGHTED AVERAGE		152,668,532			3.86

TABLE IV—ISSUES OF PUBLIC UTILITY COMMON STOCK OFFERED DURING SECOND QUARTER, 1947

Company (A)	Principal Amount (B)	Month of Offering (C)	Offering Price (D)
	\$		
Connecticut Light & Power Company—(No Par).....	8,220,900	April	50.00
Michigan Gas & Electric Company—(\$10 Par).....	710,000	April	17.75
Missouri Utilities Company—(\$1 Par).....	300,000	April	20.00
New England Gas & Electric Association—(\$8 Par).....	4,313,115	April	9.00
Houston Lighting & Power Company—(No Par).....	6,223,962	May	37.50
California Oregon Power Company—(Par \$20).....	400,000	June	22.25
California Water & Telephone Company—(Par \$25).....	516,800	June	34.00
Pacific Gas & Electric Company—(Par \$25).....	15,200,000	June	25.00
Peninsular Telephone Company—(No Par).....	530,607	June	33.00
TOTAL.....	36,415,884		

which is an increase of \$5 million over the total for the first quarter. The \$15 million Pacific Gas and Electric Company \$25 par issue offered in June at \$25 was the largest issue offered in the quarter. The second largest issue was the \$8 million Connecticut Light and Power Company no par issue offered in April at \$50.

Two serial issues were offered during the quarter. The Northern Natural Gas Com-

pany offered an issue of \$10 million 2½% debentures in April due serially from 1956 to 1967, priced to yield 2.05% to 2.625%. The Consolidated Mutual Water Company offered in June an issue of \$250 thousand 2% to 3% first mortgage serial bonds due serially 1948 to 1962.

HAROLD L. MILLER

Wisconsin Telephone Company

Book Reviews



Housing and Citizenship: A Study of Low-Cost Housing. By George Herbert Gray.
New York: Reinhold Publishing Corp.,
1946, pp. xiv, 254. \$7.50.

Major Gray stated the purpose of his book in these words (page 4): "And what is our housing problem? How did it come about? Just where does (sic) the federal government and the local government come into the picture? What about other countries—have they any experience from which we can profit? How big a job is our housing problem? What sort of start has been made? Where will it lead us? What are the ways and means which have been devised for untangling the many economic and social threads, of weaving all these strands into a fabric of national housing policy which will be truly comprehensive? It cannot be solved or even considered in a vacuum. To answer the questions raised and to provide the public, those connected with the many housing authorities, and the rising generation, particularly the student group which must face this problem—to provide them with one book covering the broader phases of our housing problem in its inter-relation to our social and economic structure this book is written."

This is no small order. In fact, as undertaken by Major Gray it is a most ambitious one. In carrying it out the Major produced both a useful and, in some ways, an annoying book.

It is useful, particularly to those who are familiar with some of the many problems and with more specialized studies, because of its scope, its loose but readable style, and because its author combined technical competence with a humane and thoughtful concern for the families now poorly housed. His grasp of the governmental and policy issues sometimes seems less sure but he does have flashes of real insight that, too often, are not followed up. Many and excellent illustrations add interest to the discussions and, apparently, also to the price of the volume.

On the other side are frequent over-simplifications and condensations that squeeze out too much of the significant variations and detail. Add to this a disturbing sloppiness in references—names misspelled, agency and organization titles sometimes correct and later wrong, careful footnotes to secondary sources but only vague mention of important official reports. Some of this may have been due to Major Gray's untimely death when the manuscript was about ready for the printer. It does, however, give the reader a feeling of insecurity and uneasiness. As a matter of fact the substantive content is reasonably accurate despite a few statements that are not clearly so. For example, British housing between the wars did not bring "close to a conclusion the approximate riddance of slums in England . . ." (page 61), nor did cooperative societies produce "75% of all the new housing in Holland" (page 73) over any substantial period of time.

On balance, this might have been a better book if Major Gray had taken in less territory and had given more attention and point to a few of the really crucial issues. But it is a book that pulls together many useful and pertinent facts. It reflects an objectivity in all too rare combination with a sound and true appreciation of human values. It can be a starting point for more thorough analyses, for more penetrating criticism of what has been done as well as for more imaginative proposals on future policy.

COLEMAN WOODBURY

University of Wisconsin



Brazil: People and Institutions. By T. Lynn Smith. Baton Rouge, Louisiana: Louisiana State University Press, 1946.
pp. 843. \$6.50.

Because of its vast scope the rich store of material crowded within the pages of this massive volume seems to demand even more

space for complete expression. An epitome of all that came within the purview of the author during two visits to Brazil, totalling a year and a month, and of a mass of related facts gathered from bookshops and public offices, it measures up to the author's description of the work as being "a comprehensive study of Brazil's people and institutions." As such, it is a valuable source book for many types of knowledge concerning that country. As a 'systematic exposition' or as an "analysis," (words also used by the author in describing this monumental compilation) there seems to be room for some further organization of material, deeper penetration and more thoughtful interpretation than could have been possible in handling so many subjects under one title. It would be presumptuous, however, for the reviewer to claim the right to apply this criticism to all of the subjects presented for the scope of his knowledge does not extend over so many fields. Two specific observations, however, may suffice to illustrate apparent defects which may or may not apply to those parts of the book upon which the reviewer is less prepared to speak.

The first of these observations pertains to the author's treatment of *fire agriculture*. The subject is dealt with in thirteen different places in the book. He refers to the system in one place as "one of the most significant aspects of Brazil's economy," in another as the "most widespread system of agriculture carried on in Brazil" and gives it a "central position in the pattern of rural living." These last two references are from his Chapter III, entitled "Fire Agriculture," in the first few pages of which he actually discusses that subject. Then suddenly, as if distracted by another interesting "societal pattern" or form of "acculturation," he enters upon a discussion of the limited use of the plow which he states "has no place in the routine activities that make up the fire-agriculture complex." He writes the last half of the chapter with only two brief references to fire-agriculture, leaving the reader to make the uncertain tie between text and chapter heading. As a description of some of the many interesting cultural patterns for which the book is noteworthy, the chapter under a different title would be a success. As an analysis of fire-agriculture, the chapter lacks both substance and interpretation required to impress the reader with the tremendous economic significance of the devastation being wrought

by fire in the Brazilian forests. Nor does it present the economic importance of certain more modern types of farming which have developed from this primitive fire-agriculture, such as that found on the cotton-livestock estates of central-southern Brazil.

The second observation pertains to the author's attempted interpretation of the basic sources of influences which have determined the outstanding land tenure patterns of Brazil. He minimizes the influence of Portuguese tradition, stating that the break between the institutions of Brazil and Portugal "had been much sharper than that which occurred between the Spanish-American countries and Spain." He contrasts Brazil's "exclusive use of the large estate" with Portugal's "widespread system of small farms," Brazil's "scattered farmsteads and trade-center towns and villages" with Portugal's "village settlement patterns," and the Brazilian diet "deficient in nutritive elements" with "the more adequate and better balanced consumption patterns of Portugal."

Village settlements of small freeholders, which according to the author were the dominant pattern of Portugal, are not characteristic of Brazil. The large estates, however, which are "prominent throughout the Brazilian countryside," utilize the "nucleated form of settlement" and therefore present a village population arrangement. The "comfortable" to "elaborate" home of the proprietor is surrounded by the various processing facilities, store houses, school, chapel, and a large number of houses occupied by those who perform the manual labor. The prevalence of scattered farmsteads, however, the line village, a pattern intermediate between the nucleated village and scattered farmsteads, a large semi-nomadic population practicing fire-agriculture, and the absence of the freehold village have caused the author, it seems, to underestimate European influence upon Brazilian land tenure and settlement.

Portugal for many centuries had the same political and cultural background as did Castile, León and Extremadura which played so important a role in the settlement of Spanish America. She experienced the same struggle between the Christians and the Arabs, out of which developed the same dual system of land tenure and political organization which had divided Spain for centuries. One part of the population was organized into municipal communities, the other under an

aristocratic patronage which stratified society into landed nobles, free men and serfs. The latter were legally freed about the time Portugal gained her independence but the complete shift to the municipal organization described by author Smith was gradual, particularly with respect to its praedial aspects, and probably the patronage system was still an important influence in the colonization of Brazil which was begun by D. João III (1521-1557). The colonial history of Brazil was one of large estates, their proprietors, their slaves and Indian serfs. They undoubtedly were patterned, as were the great estates of the Spanish colonies, after those of Europe which had emerged from the Roman-Gothic patronage system of primitive Spain.

The reviewer, therefore, entreats the author to examine further the similarities as well as the differences in the Portuguese and Spanish-American tenure patterns and to look farther back into Portuguese and Spanish history, where he is sure to find influences which he has failed to observe in his present writing; and, if he should go back still further into the Roman and Gothic beginnings, he may be able to recognize some of the same tenure patterns which he has observed in Brazil and has so well described. And, should he extend his studies to Argentina and southern Bolivia, he may be inclined to alter his views concerning a "sharp break" from traditional patterns and to recognize similarities among differences within the Hispanic American countries. The differences he has recognized in Brazil are there but probably only mark an early stage of progress which is sure to overtake all of the countries in their turn. Thus, comparisons made on a historical basis may make it possible to distinguish more clearly that which is European from that which is only of the New World and that which is a fundamental background characteristic from that which is a modern trend.

DAVID WEEKS

University of California



Economic Research and the Development of Economic Science and Public Policy, National Bureau of Economic Research, 1946, pp. ix, 198. \$1.00.

The National Bureau of Economic Research reached its twenty-fifth year in 1945.

One year later, in June 1946, its friends gave it a birthday party. Twelve economists paid their regards by presenting papers of varying degrees of brevity, printed in one volume under a title suggestive of their breadth of compass—if also of their miscellaneity. Arthur F. Burns, in his preface, delicately anticipates the reader's disconcertion by forewarning him that the "unity of the papers lies not in their specific content . . ." but in the several economists' faith in the value of systematic research. The papers range from a comment on the contribution of empirical research in developing economic science to a review of recent economic research in France, and from a treatise on international research on gold and prices to the half-answered query, "whither now?"

Under this superficial appearance of heterogeneity, however, lies unanimity of purpose; what R. H. Coats calls a "heart-searching" for clues to the role of statistical research in the future shaping of economic events. The questions involved in settling this problem are suggested by the tri-partite title.

Regarding method, W. C. Mitchell gives us for answer what largely his strivings have made a platitude, that "theoretical" and "empirical" economics must work hand in hand (though budget requirements keep the latter trailing behind). A suggestion of how this may be methodologically effected is given in J. Tinbergen's analysis of "Unstable Equilibria in the Balance of Payments," illustrating what is "now commonly known as the econometric method, [which] is characterized by an interplay of economic theory and statistical analysis, both in as rigorous a form as possible." One wishes that he had brought his discussion more to the point by informing us how statistical analysis "tests" (as Mitchell says it must) "the assumptions on which [theoretical] reasoning proceeds, or the conclusions it reaches, or both." Perhaps Tinbergen is heeding Coats' advice: "Never, if you are an empiric, get into an argument over the philosophy of method—that is walking straight into the a priori parlor;" indeed, only Coats in his delightful, "Considerations by the Way," digs deeply into the problems of method; but his answers are more suggestive than precise.

The diverse content of several of the papers makes individual comment impossible in a brief review. Loveday, Goldenweiser, Douglas and Davis deal with possibilities of utiliz.

ing economic science in public policy formulation. Jacobsson, Rist, Jewkes and Tinbergen discuss foreign and international economic topics. R. B. Warren writes of our experience with monetary controls.

A notable characteristic (shall we call it bias?) of the book is its general emphasis on problems of "full employment" and the "business cycle" at the expense—in spite of its cosmopolitan orientation—of consideration of the causes of low productivity over most of the earth. Can it be that statistical "fact finding" can make so little contribution to this area of inquiry which surely must soon raise for economists the most perplexing of questions, pressing for early solution? Noticeable, too, are two writers' admonishments to statistical economists: do not make predictions, merely analyze trends. Are they uneasy over the continuance of our present high level of employment?

We end on a happy note. Coats believes that if he is invited to the National Bureau's next anniversary party, it will not be the atom bomb that will prevent his attending.

ERVEN J. LONG

University of Wisconsin



The Structure of Transcontinental Railroad Rates.

By Stuart Daggett and John P. Carter.
Berkeley and Los Angeles: University of California Press, 1947. pp. viii, 165.
\$4.00.

This volume, the first part of a broader study of the effects of railroad rate structures on the economy of California, is an analysis of the structure of transcontinental railroad rates on specified commodities which are shipped from or to points in California. The authors introduce their monograph with a discussion of the rate problems created by topography and distance in western rate territory, devote a chapter to the mechanics of transcontinental rate-making, indicate the importance of grouping of points of origin and destinations on rate structures, and then examine the construction and levels of selected class rates and commodity rates for seven

groups of California's leading "exports" and for ten groups of its principal "imports."

The structure of transcontinental rates is complex, with class rates having somewhat more regular profiles than commodity rates. In general, though with important exceptions, class rates on eastbound traffic are quoted from points of origin to destinations in rate zones established in the Transcontinental Freight Bureau territory. However, most traffic to and from California moves under commodity rates, the profiles of which are irregular. Commodity rates are simplified by consolidating rate zones and complicated by subdividing rate zones, the usual purpose of such zone reclassification being to permit either shippers or carriers to compete more effectively. Commodity rate profiles westbound are somewhat more regular than eastbound, the result of consolidation of destinations into larger groupings.

Both class and commodity rates eastbound are found to be relatively low within the state of California and to destinations in adjacent states, and relatively high on middle distance hauls. Transcontinental class rates are relatively high, but transcontinental commodity rates are relatively low per mile. The latter permit western shippers to compete in eastern markets and western railroads to compete with intercoastal water carriers. Transcontinental rates are not unfavorable to California shippers on hauls within the state, on west coast traffic or on transcontinental hauls. The eastern consumer is apparently benefitted by eastbound rate structures and, though the evidence is not definitive, western consumers may suffer some disadvantage as a result of westbound rates.

These and other conclusions are subject to the limitation that the available material studied was representative but limited, a study of all rates obviously being beyond the scope of a small group of investigators. The conclusions are also subject to modification as a result of a recent decision of the United States Supreme Court. (67 S.Ct. 1207.)

This monograph is ably written, is well illustrated with maps, charts and tables, and represents a distinct contribution in this highly technical field.

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